



TokenLink® Velocity™ XL PCI Network Interface Card User Guide

A member of the high-performance
TokenLink Velocity family

<http://www.3com.com/>

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FCC CLASS B STATEMENT

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ABOUT THIS GUIDE

About This Guide provides an overview of this guide, describes guide conventions, and tells you where to look for specific information.

This guide describes how to install, configure, and troubleshoot the 3C359 TokenLink® Velocity™ XL PCI network interface card (NIC). This NIC is referred to as the 3C359 NIC in this guide.



The HELP directory on TokenDisk® diskette #1 contains the latest technical information.

This guide is intended for network installers who are familiar with local area networking (LAN) technology, token ring technology, and network interface card installation.



If the information in the release notes shipped with your product differs from the information in this guide, follow the instructions in the release notes.

Finding Specific Information in This Guide

This table shows the location of specific information in this guide.

If you are looking for	Turn to
3C359 NIC features and product overview	Chapter 1
3C359 NIC installation overview	Chapter 1
3C359 NIC installation and cabling procedures	Chapter 2
Driver installation procedures for Novell NetWare environments	Chapter 3
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If you are looking for	Turn to
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Conventions

Table 1 and Table 2 list conventions that are used throughout this guide.

Table 1 Notice Icons

Icon	Notice Type	Description
	Information note	Important features or instructions
	Caution	Information to alert you to potential damage to a program, system, or device
	Warning	Information to alert you to potential personal injury

Table 2 Text Conventions

Convention	Description
Syntax	The word "syntax" means you must evaluate the syntax provided and supply the appropriate values. Placeholders for values you must supply appear in angle brackets. Example: Enable RIPIIP by using the following syntax: <pre>SETDefault !<port> -RIPIIP CONTROL = Listen</pre> In this example, you must supply a port number for <port>.
Screen displays	This typeface represents information as it appears on the screen.

(continued)

Table 2 Text Conventions (continued)

Convention	Description
The words “enter” and “type”	When you see the word “enter” in this guide, you must type something, and then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says “type.”
<i>Menu commands</i> and <i>buttons</i>	Menu commands or button names appear in italics. Example: From the <i>Help</i> menu, select <i>Contents</i> .
Words in <i>italicized</i> type	Italics emphasize a point or denote new terms at the place where they are defined in the text.



1

INTRODUCTION

The 3Com TokenLink® Velocity™ XL PCI network interface card (NIC) is a high-performance token ring network adapter for personal computers (PCs) with a Peripheral Component Interconnect (PCI) bus.

The 3C359 NIC provides a high-performance 32-bit PCI local bus interface with bus mastering that runs at a clock speed of 33 MHz.

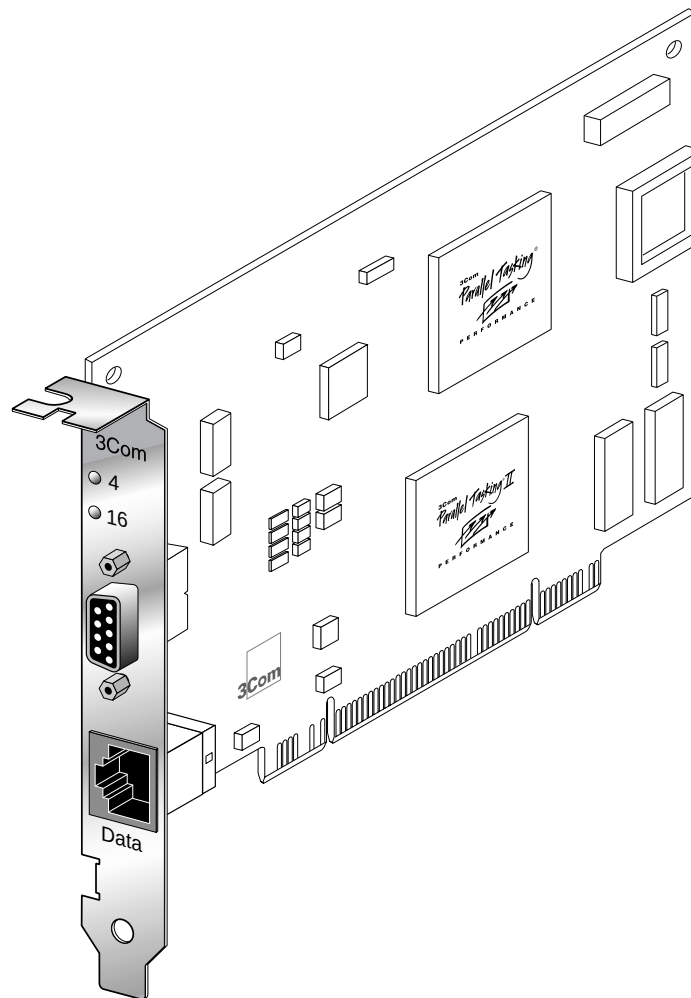


Figure 1-1 TokenLink Velocity XL PCI 3C359 NIC

High-Performance Features of the 3C359 NIC

The 3C359 NIC delivers the token ring industry's highest performance for the lowest cost, and is designed to provide years of trouble-free operation. This section describes the NIC's high-performance features.

Parallel Tasking II Performance

The 3C359 NIC's design incorporates new Parallel Tasking® II performance, which takes advantage of the latest developments in PCI bus design to deliver the fastest data throughput and lowest CPU utilization of any token ring NIC.

Parallel Tasking II performance is built upon a solid foundation of proven Parallel Tasking architecture, which introduced data pipelining and overlapping task processing to improve throughput and achieve the industry's fastest data transmission and reception speeds.

DynamicAccess Class of Service

3Com's DynamicAccess™ software adds intelligence to the 3C359 NIC for optimized performance and control. With DynamicAccess Class of Service (Traffic Prioritization), you can select time-critical applications that require the highest-priority access to your network—such as multimedia sessions. Based on your selection, the network device driver recognizes high-priority applications, prioritizes their data transmissions, and accelerates their data transmissions in the following ways:

- The NIC implements dual queues, allowing high-priority traffic to be queued for transmission before normal-priority traffic.
- High-priority traffic is allowed to request and use high-priority tokens (as specified in the IEEE 802.5 standard). This tends to reduce the latency experienced in acquiring a suitable token for transmission onto the network.



Class of Service (Traffic Prioritization) is available only with the NDIS 4.0 miniport driver supporting the following operating systems: Windows NT 4.0 and Windows 98.

Support for Full-Duplex/Dedicated Token Ring

Full-duplex/Dedicated Token Ring (DTR) is an enhancement to the IEEE 802.5 standard that allows a token ring switch port to be dedicated to a station.

In full-duplex mode, a station can simultaneously transmit and receive independent data streams for potential data throughput of 32 Mbps. The 3C359 NIC can operate in full-duplex mode when attached to a DTR switch.

Wake-up On LAN Capability

The 3C359 NIC provides Wake-up On LAN (WOL) capability, which, with the appropriate applications, lets you remotely perform installations, software upgrades, and other management tasks from a central location, even if the PCs in your network have been turned off.

The 3C359 NIC's WOL support conforms to the Advanced Configuration and Power Interface OnNow/(ACPI) specification, and applies only to PCs conforming to *PCI Bus Power Management Interface Specification 1.0* that have power management capabilities running under Microsoft Windows 98 or Windows NT 5.0.

Other Features of the 3C359 NIC

The 3C359 NIC supports the following features:

- Completely automatic hardware configuration through PCI registration.
- Auto ring speed detection option that permits the 3C359 NIC drivers for all supported environments to detect and operate at the current ring data rate.
- LED ring speed indicators.
- Boot ROM socket that supports the 3C359-TRIROM, an optional token ring boot ROM with BootWare for TCP/IP, NetWare, and RPL environments. The TriROM allows you to boot PCs (with or without hard drives) remotely from a LAN server. (The TriROM is sold and documented separately. Contact your local reseller for further details.)

- AutoLink™ software for easy installation of NetWare 16-bit client drivers.
- Plug and Play for worry-free installation.
- Promiscuous mode support for Windows 95, Windows NT, and Novell NetWare drivers. While operating in this mode, the NIC receives and forwards all network packets that arrive (regardless of the node to which they are addressed), allowing you to easily identify and resolve problems on the network.
- DOS diagnostic programs to aid problem solving.
- Full connectivity with IBM AS/400 and mainframe computers, and compatibility with legacy IBM applications.
- Multicast filtering.
- CISPR B and FCC B certification for reduced electromagnetic interference when using either STP or UTP cables.
- On-board RJ-45 and DB-9 ports for connecting UTP or STP cables without using an external media filter.

Installation Overview

This section outlines the major steps for completing a 3C359 NIC installation. It also indicates the sections in this guide that can help you at each stage.

Follow these steps to successfully install and configure the 3C359 NIC.

- 1 Insert the 3C359 NIC in a PCI bus master slot in your PC. Connect the NIC to a compatible network component using the appropriate cables.**

See Chapter 2, "Installing the 3C359 NIC," for detailed instructions.

- 2 Install the network driver that is appropriate for your PC's operating system environment from the *TokenDisk* diskettes or from the *TokenDisk* CD.**

Driver installation instructions in this guide are organized by operating system environment. See the table of contents to locate the chapter containing the installation instructions appropriate for your environment.

3 Configure features that are appropriate for your installation, if necessary. For example:

- Auto Ring Speed Detection:
Automatically enabled for all drivers, this feature can be disabled (recommended for servers) if necessary.
- Class of Service:
Automatically disabled, this feature can be enabled for the NDIS 4 driver running under Windows NT or Windows 98.
- Locally Administered Address (LAA):
You can manually define an LAA that overrides the NIC's universal address encoded during manufacturing.
See feature configuration instructions in the chapter for your operating system environment.

4 Run diagnostics, if necessary.

If you experience problems during the installation process, you can check the configuration setup and test for physical NIC problems by running the DOS Configuration and Diagnostic Program, located on *TokenDisk* diskette #1 or on the *TokenDisk* CD.

See Chapter 6, "Troubleshooting," for instructions on using the Configuration and Diagnostic Program. This chapter also describes how to isolate and solve various hardware and network cabling problems.



2

INSTALLING THE 3C359 NIC

This chapter describes inserting the 3C359 NIC in a PC and connecting the PC to a network.

Installation Requirements

Installing the 3C359 NIC requires the following:

- A PCI-bus personal computer with an 80486, Pentium, or other Intel-compatible processor
- A 32-bit or 64-bit PCI expansion slot that supports bus mastering
- A high-density 3.5-inch disk drive or CD-ROM drive
- Category 3, 4, or 5 UTP cables, or type 1 or 6 STP cables
- *TokenDisk* diskettes #1 and #2 (or *TokenDisk* CD) containing the AutoLink installation program, network driver software, the DOS Configuration and Diagnostic Program, and online user documentation (CD only)

Safety Precautions



WARNING: PCs operate with voltages that can be lethal. Before removing the cover, follow these steps to protect yourself and the PC.

- 1 **Remove any diskettes and CDs from the computer's disk drives.**
- 2 **Turn off the PC and unplug it.**



CAUTION: To avoid permanent damage to the NIC or other computer circuitry, always turn off the computer's power when inserting or removing the NIC.

- 3 **Disconnect all cables that are connected to the computer.**
- 4 **Remove jewelry from your hands and wrists.**

5 Reduce any static electricity on your body.

Each NIC is packed in an antistatic container to protect it during shipment. To avoid damaging any static-sensitive components after removal from the container, be sure to reduce any static electricity on your body.

One way to reduce static electricity is to touch an unpainted part of the computer's metal chassis. You can maintain grounding by wearing an antistatic wrist strap attached to the chassis.

6 Verify that your tools are nonconducting or insulated.

Your tools should include a flat-head screwdriver and a Phillips-head screwdriver. To avoid permanent damage to the NIC or other computer circuitry, use only insulated or nonconducting tools.

Unpacking and Inspecting the 3C359 NIC

The contents of the 3C359 NIC package follow. If items are missing, contact your authorized network supplier immediately.

- TokenLink Velocity XL PCI 3C359 NIC
- *TokenDisk* diskettes #1 and #2
- *TokenDisk* CD
- *TokenLink Velocity XL PCI Network Interface Card User Guide* and *Quick Start Guide*

1 Unpack the 3C359 NIC and remove it from its antistatic container.**2 Lay the NIC on its antistatic container.****3 Inspect the NIC for visible signs of damage.**

If you find damage, immediately notify your authorized network supplier and the carrier that delivered the NIC.

4 If you have purchased the separate TriROM accessory, install it in the 3C359 NIC's boot ROM socket according to instructions supplied with the TriROM.

Complete the Product Registration Card and return it to 3Com, or call 1-800-NET-3Com for immediate registration.

Inserting the 3C359 NIC

Follow these steps to insert the 3C359 NIC:

- 1 Remove the computer's cover and select a PCI expansion slot that supports bus mastering.**

You can install the 3C359 NIC in either a standard bus master 32-bit slot, as shown in Figure 2-1, or a newer bus master 64-bit slot. If both slot types are available in your PC, place the NIC in the 32-bit slot.

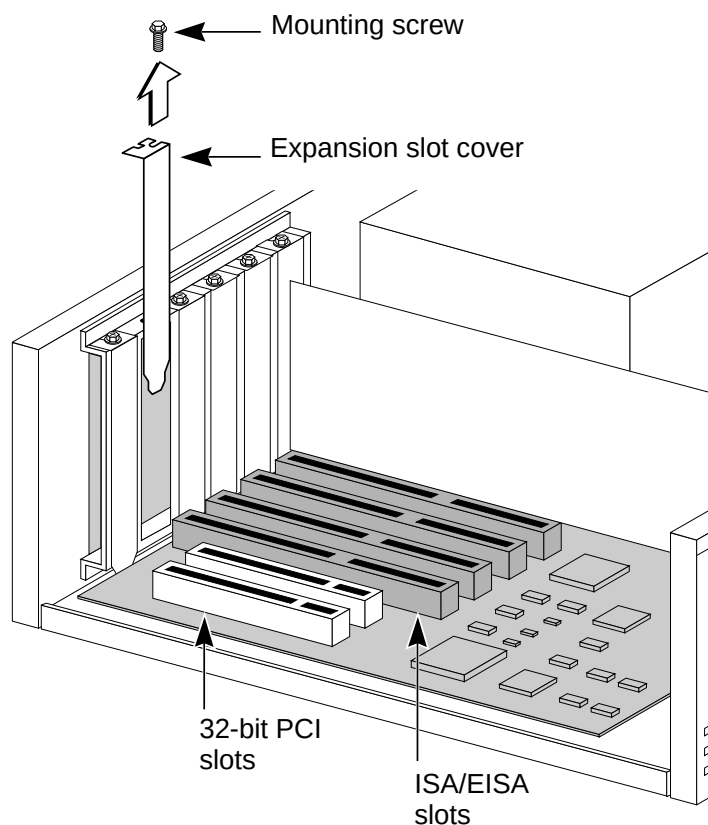


Figure 2-1 Removing the Expansion Slot Cover



Verify that the selected slot is a PCI bus master slot by consulting your computer documentation, manufacturer, or vendor.

- 2 Unfasten and remove the expansion slot cover (Figure 2-1) from the selected bus master PCI slot.**

Store the expansion slot cover for future use, but retain the mounting screw for securing the NIC.

3 Insert the 3C359 NIC in an empty PCI bus master slot and secure the mounting screw, as shown in Figure 2-2.

Make sure the NIC is completely seated in the slot by pushing down firmly on both ends of the NIC. When the NIC is correctly seated, the gold connecting fingers inserted in the slot do not show.

Note the slot number of the NIC. You may need it during driver installation.

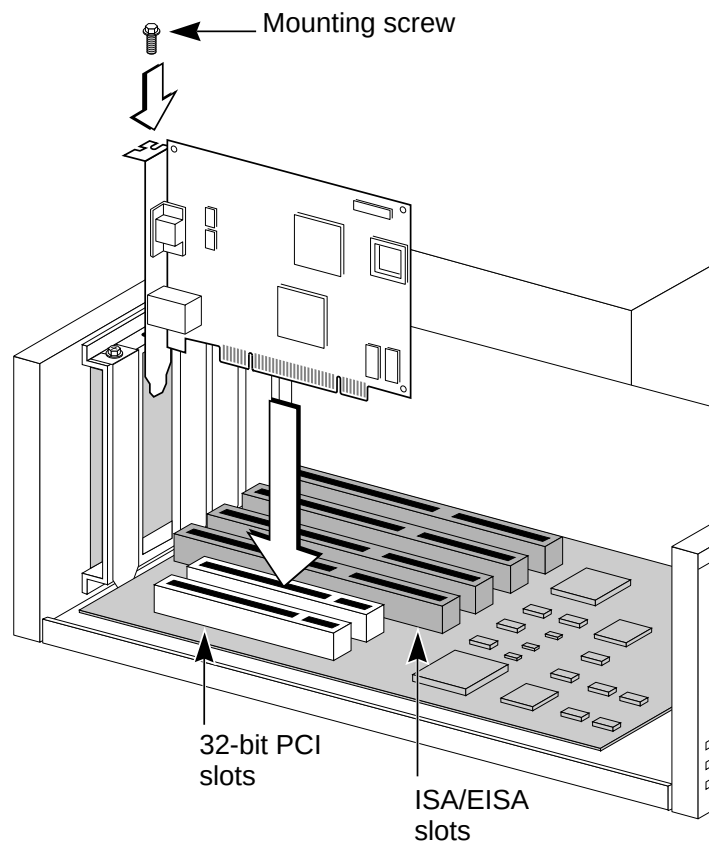


Figure 2-2 Inserting the 3C359 NIC

4 Replace the unit's cover and reconnect any cables that you may have disconnected from other devices (see "Safety Precautions").

5 Turn the power on.

When power is turned on, the PCI system automatically configures the NIC.

6 Connect one of the following network cable types to the 3C359 NIC:

- Shielded twisted-pair (STP) cable with a DB-9 connector
- Unshielded twisted-pair (UTP) cable with an RJ-45 connector

TokenLink Velocity NICs support industry-standard token ring Category 3, 4 or 5 UTP or types 1 or 6 STP cabling. These cables meet IEEE 802.5 specifications. (See Appendix A, "Specifications," for detailed information regarding cable requirements and connector pin assignments for the 3C359 NIC.)

7 Connect the other end of the cable to a network dual access unit (DAU), a multistation access unit (MAU), controlled access unit (CAU), or a token ring switch.



The 3C359 NIC can operate in full-duplex mode when attached to a Dedicated Token Ring (DTR)-enabled switch. Full-duplex mode is enabled automatically.

8 Return all packing materials to the shipping container.

If it is necessary to return the 3C359 NIC to 3Com, pack it in the original (or equivalent) packing material to maintain the warranty.



3

NOVELL NETWARE ENVIRONMENTS

This chapter describes how to install a 3C359 NIC network device driver for various Novell NetWare network operating system environments.

Before you install a NetWare driver, make sure that the 3C359 NIC is inserted in the PC as described in Chapter 2.

Installing a DOS 16-Bit Client Driver

This section describes installing the DOS 16-bit client driver using two methods:

- Automatically, using the 3Com AutoLink software utility
- Manually, using a NetWare installation utility and *TokenDisk* diskette or CD

Installing a DOS 16-Bit Client Automatically

The 3Com AutoLink software utility automatically configures one 3C359 NIC and installs the DOS 16-bit ODI client network driver for NetWare 3.12 and 4.1x systems. This section describes running the AutoLink program.

AutoLink Software Functions

AutoLink software configures your PC as a NetWare DOS ODI client. The AutoLink installation utility performs the following functions:

- Installs a DOS NetWare Universal Client Virtual Loadable Module (VLM) from *TokenDisk* diskette #1, or from the *TokenDisk* CD.



The AutoLink installation utility cannot be used to install multiple 3C359 NICs.

- Modifies the CONFIG.SYS, AUTOEXEC.BAT, and NET.CFG files. (The previous versions of these files are renamed CONFIG.3CM, AUTOEXEC.3CM, and NET.3CM.)



The AutoLink installation utility is a DOS application. It cannot run in a Windows NT or Windows 95 DOS window, and it cannot be used to install an OS/2, Windows NT, or Windows 95 client. For these operating systems, use the manual installation procedure described later in this chapter.

Before Using the AutoLink Configuration Utility

Make sure that the following steps have been performed before using the AutoLink installation utility:

- The 3C359 NIC is installed in your DOS-based PC and is connected to the network.
- NetWare version 3.12 or 4.1x is installed on the server.
- A NetWare user account is available with a user ID and password.
- DOS version 3.2 or later is installed on the client PC, and the PC has been booted under DOS.
- The PC has at least 1 MB of free hard disk space.

Modifying AutoLink Default Settings

Use the AUTOLINK.CFG file to modify the AutoLink installation process. The AUTOLINK.CFG file in the \AUTOLINK directory on *TokenDisk* diskette #1 (or on the *TokenDisk* CD) contains default settings and descriptions of the AUTOLINK parameters.

See the AUTOLINK.TXT file in the \AUTOLINK directory for information on customizing AutoLink and server support.

Running the AutoLink Program

The AutoLink program loads the NetWare DOS ODI 16-bit client driver. To run the AutoLink program, follow these steps:

- 1 Install the 3C359 NIC and connect it to the network as described in Chapter 2.**
- 2 Restart the PC from DOS, verifying that no network drivers are loaded.**

If you are using DOS version 6.x, press F5 after the "Starting MS-DOS..." message is displayed as DOS loads. This prevents any drivers or memory managers from loading. If you are using an earlier version of DOS, boot from a DOS diskette that does not contain drivers.

- 3 If you are using the 3.5-inch diskettes, insert *TokenDisk* diskette #1 in the drive and enter:**

a:

If you are using the *TokenDisk* CD, insert it in the CD-ROM drive and enter the drive letter.

For example:

d:

- 4 Enter:**

autoLink

An AutoLink information window is displayed.

- 5 From the AutoLink Information window, press Enter.**

The first time you use AutoLink, the 3Com software license appears.

- 6 To accept the terms and conditions, enter:**

y



To view the full text of the license agreement, press F1.

- 7 When the information window appears, press Enter to continue.**

A status message appears, followed by a prompt for the ring speed of your network.

- 8 Enter the ring speed.**

- 9 When the auto installation process is finished, remove the *TokenDisk* diskette or *TokenDisk* CD and restart your PC.**

The login prompt for a NetWare server appears.

- 10 Log in to the NetWare server with your ID and password.**

Your PC is now configured as a NetWare DOS ODI client.

If you experience problems using AutoLink, see the next section, "AutoLink Troubleshooting." If you cannot connect to the NetWare server after running AutoLink, see Chapter 6, "Troubleshooting."

AutoLink Troubleshooting

If you experience problems when using the AutoLink program, display or print the AUTOLINK.LOG file, which contains a log of the events that occurred during the AutoLink installation and configuration process.

- 1 **To display the file, enter the following DOS command:**
`type autolink.log | more`
- 2 **To print the file, connect to a local printer and enter:**
`copy autolink.log prn`
or
`print autolink.log`

Installing a DOS 16-Bit Client Manually

If you did not use the AutoLink configuration utility, follow these steps to install the DOS 16-bit client driver for NetWare:

- 1 **Insert the *Novell NetWare Client for DOS and Microsoft Windows Disk 1* and make that drive the active drive. For example, enter:**
`a:`
- 2 **Enter the following command:**
`install`
Follow the displayed instructions as they appear.
- 3 **When prompted to select the driver for your network board, scroll down through the list titled *Network Boards*. Select *Other Drivers*, and press Enter.**
- 4 **If you are using the 3.5-inch *TokenDisk* diskettes, insert *TokenDisk* diskette #1 in the drive and make that drive the active drive. For example, enter:**
`a:`
If you are using the *TokenDisk* CD, insert it in the CD-ROM drive and enter the location of the DOS 16-bit client driver:
`<drive>\netware\nwclient`
- 5 **Select *3Com TokenLink Velocity XL PCI* and press Enter.**
The program copies all relevant files and makes required changes to the AUTOEXEC.BAT and CONFIG.SYS files.

- 6 Copy the microcode file TLNKP.MAC to the NetWare client directory on the hard drive. For example, if you are using the 3.5-inch *TokenDisk* diskettes, enter:**

copy a:\tlnkp.mac c:\nwclient

If you are using the *TokenDisk* CD, substitute the appropriate drive in the path.

- 7 Restart your PC to start the NetWare 16-bit client.**

This completes the procedure for manually installing a NetWare DOS 16-bit client driver.

Configuring the DOS 16-Bit Client Driver

You can edit the NET.CFG file to change the ring speed or transmit/receive mode. Follow these steps:

- 1 Using a word processor or text editor, such as the DOS Editor, open the C:\NWCLIENT\NET.CFG file.**
- 2 Scroll through the file and locate the following lines:**

LINK DRIVER TLNKPODI

- 3 Add the appropriate keywords as shown below.**

LINK DRIVER TLNKPODI

ringspeed <auto | 4 | 16>

<classic | dtr>

where RINGSPEED AUTO forces the driver to detect the current ring speed and to connect at that speed. The default setting is AUTO. You do not need to specify the AUTO setting; it is automatically enabled. If the connection fails, try one of the other speed settings: 4 or 16. A setting of 4 forces the driver to always open the connection at 4 Mbps; a setting of 16 forces the driver to always open the connection at 16 Mbps.

The keyword CLASSIC sets the transmit/receive mode to the half-duplex Token Passing Protocol (TKP). The keyword DTR sets the transmit/receive mode to the full-duplex Transmit Immediate Protocol (TXI). Operating in TXI mode is recommended; if full-duplex mode fails, try TKP mode.

Installing DOS Client32

This section describes installing the TLNKPODI.LAN DOS Client32 driver for a NetWare Client32 environment. For the driver installation procedure, you need the Novell Client32 diskettes and either the *TokenDisk* CD or *TokenDisk* diskette #1.

- 1 Insert the Novell Client32 setup diskette #1 into a drive, switch to that drive, and enter the Install command. For example, if the diskette is in drive A, enter:**
`a:\install`
- 2 Read the Novell information window and press Enter.**
The displayed window lists installation options.
- 3 Use the arrow keys to move to the options you need. Press the spacebar to select the option.**
The system prompts you for configuration information.
- 4 Confirm the configuration and press Enter.**
- 5 If your configuration requires TCP/IP, supply the IP Address, Router, Subnetmask, DNS Domain, and Domain Name Server Address. Press Enter.**
- 6 When prompted for the LAN Driver type, select 32-bit and press Enter.**
The 32-bit Network Board Drivers window is displayed.
- 7 When prompted to select the driver, scroll to *User specified 32-bit driver*.**
- 8 Insert *TokenDisk* diskette #1 in the drive or the *TokenDisk* CD in the CD-ROM drive. Enter the following path:**
`<drive>:\netware\client32`
- 9 Select *TokenLink Velocity XL PCI* and press Enter.**
The system allows you to change the configuration.
- 10 To change a parameter, select it and press Enter. Type the new value. When you are finished changing parameters, press Enter.**

- 11 When the path for the configuration files is displayed, verify that the path is correct and press Enter.
- 12 Press Enter again to return to DOS and edit the STARTNET.BAT file.
- 13 Add the NIC's slot number in the STARTNET.BAT file as follows:

```
load c:\novell\client32\tlnkpodl.lan frame=token-ring msb slot=<nnnn>
```

where <nnnn> is the slot number.



If you do not know your NIC's slot number, you can turn off your PC, remove the cover, and check the slot.

- 14 On the same LOAD line, you can set the NIC's ring speed as follows.

```
load c:\novell\client32\tlnkpodl.lan...ringspeed=<auto | 4 | 16>
```

where <auto | 4 | 16> is the ring speed setting:

- **Auto** — Allows the NIC to automatically detect the ring speed. (This is the default setting.)
- **4** — Disables auto ring speed detection and sets the NIC ring speed at 4 Mbps.
- **16** — Disables auto ring speed detection and sets the NIC ring speed at 16 Mbps.

- 15 Restart your workstation to start Client32.

The system prompts you for the 3C359 NIC's slot when the TLNKPODI.LAN driver is loaded.

Installing an OS/2 Client Driver for NetWare

This section describes installing the driver for an OS/2 client. Before installing the OS/2 ODI driver from the *TokenDisk* diskette or *TokenDisk* CD, ensure that the OS/2 operating system is installed and that the computer boots without errors. Install the 3C359 NIC as described in Chapter 2.

The Novell NetWare OS/2 ODI driver (TLNKPODI.SYS) is available on the *TokenDisk* CD or *TokenDisk* diskette #1.

Selecting the Appropriate NIC Address

Before starting the OS/2 ODI client driver installation process, you should decide whether the 3C359 NIC will use the universal address or a locally administered address.

- **Universal address (UAA)**—A default address for the NIC. It is encoded on the NIC during manufacturing and is often called the “burned-in” address. For example: 00600891CCA8.
- **Locally administered address (LAA)**—A user-assigned address that overrides the NIC’s universal address. This address must consist of 12 hexadecimal digits in the range from X’4000 0000 0000’ to X’7FFF FFFF FFFF’ and must be unique throughout the network.

Displaying the Universal Address

The Configuration and Diagnostic Program displays the 3C359 NIC’s universal address. Follow these steps to display the universal address:

- 1 **Boot from a DOS diskette to run the diagnostic program. Display the DOS prompt.**
- 2 **If you are using the 3.5-inch *TokenDisk* diskettes, insert *TokenDisk* diskette #1 in the drive and make that drive the active drive. For example, enter:**
a:
If you are using the *TokenDisk* CD, insert it and make the CD-ROM drive the active drive. For example, enter:
d:
- 3 **Enter the following command:**
3pcid

The Configuration and Diagnostic Program window is displayed as shown in Figure 3-1.

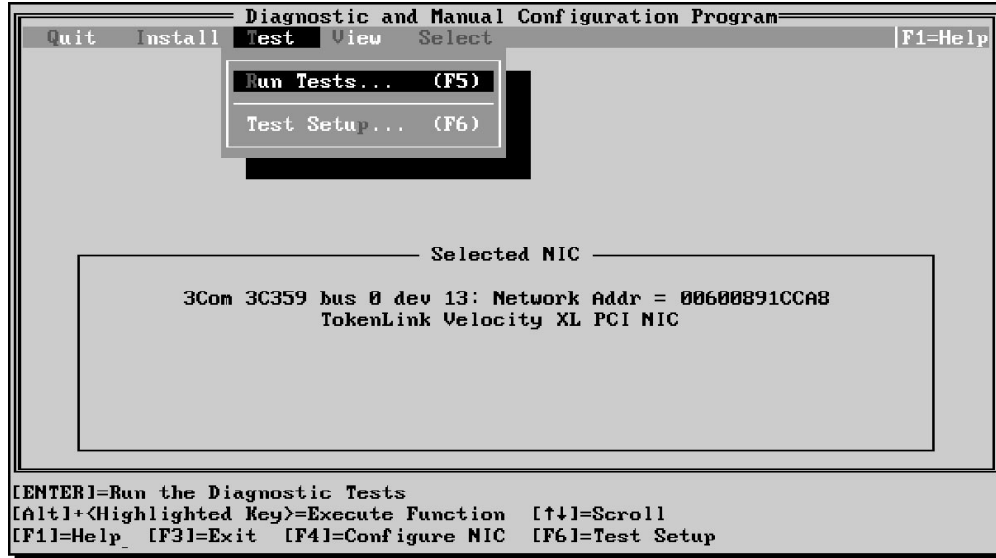


Figure 3-1 Configuration and Diagnostic Program Window

- 4 **Record for future reference the 12-digit universal token ring address displayed on the Diagnostic and Configuration Program window (Figure 3-1). For example:**

Network Addr = 00600891CCA8

Next, continue with the next section to install Novell OS/2 Requester and the ODI LAN driver TLNKPODI.SYS.

Installing the Novell OS/2 Requester

Follow these steps to install Novell OS/2 Requester and the ODI LAN driver TLNKPODI.SYS:

- 1 **Insert the Novell *OS/2 Requester* diskette, WSOS2_1, in the drive.**
- 2 **At the OS/2 Full Screen prompt, make the drive containing the diskette the active drive. For example, enter:**
a:
- 3 **At the A: prompt, enter:**
install

A *NetWare Workstation for OS/2 Installation Utility* menu appears.

4 Select *Installation* from the menu and then *Requester on Workstation*.

5 Select a target directory for the Requester files. The default is C:\NETWARE. Select *OK*.

A new menu appears with four options:

- Edit CONFIG.SYS and Copy All Files (default)
- Only Edit CONFIG.SYS
- Only Copy Requester Files
- Only Copy ODI LAN Driver Files

6 From this menu, select the option *Edit CONFIG.SYS and Copy All Files* and then select *OK*.

A dialog box appears, asking for an ODI LAN driver and presenting two options:

- Do not upgrade the currently installed LAN driver
- Choose from the list or type a driver name

7 Enter the driver name for the TokenLink Velocity XL PCI NIC:

tlnkpodl.sys

8 When prompted, select the default configuration:

IPX Support for DOS or Windows (OFF)

9 Select *CONTINUE*.

A new menu appears with three optional protocols:

- SPX Support for OS/2 Sessions
- NetBIOS Emulation for OS/2 Sessions
- Remote Named Pipe Support

10 Select the appropriate protocol and save the configuration.



If no additional protocols are needed, do not select any of the three options. Bypass this section by choosing Save the configuration.

A new menu appears, asking if you want to save changes to the CONFIG.SYS file.

11 Save the file as C:\CONFIG.SYS and click *OK* to continue.

A new window appears, confirming that you want all files copied to C:\NETWARE.

12 Click *COPY* and follow the displayed instructions.

Continue the installation and insert the appropriate *OS/2 Requester* diskettes when prompted.

After the *OS/2 Utility* diskette is installed, a window appears that requests information about the ODI LAN drivers. The default ODI LAN driver is TLNKPODI.SYS.

13 Insert *TokenDisk* diskette #1 or the *TokenDisk* CD in the appropriate drive.**14 Select *Copy Only the Default Driver* and click *OK*.****15 Follow the displayed installation instructions and insert the appropriate *OS/2 Requester* diskettes when prompted.**

When the installation is complete, a menu appears with the following menu bar items:

- Installation
- Configuration
- Utilities
- Readme
- Help

A message is displayed, stating that the installation process is complete. Follow the instructions, and continue with configuration steps in the following section.

Configuring the Novell OS/2 Requester

When you have followed the displayed instructions at the end of the Novell OS/2 Requester installation process, a message appears concerning certain configuration requirements.

After reading the message regarding configuration requirements, follow these steps:

- 1 Click the *Configuration* menu bar item and select "*This Workstation...*" to check the NET.CFG file for the proper NIC configuration.**
- 2 Verify the link driver header, node address, and frame type.**

Your NET.CFG file should look similar to the following:

```
LINK DRIVER TLNKPODI
Node Address 00608C112233
Frame Token-Ring MSB
Frame Token-Ring_SNAP MSB
```

The node address should be set to the UAA or the LAA. Modify and save the NET.CFG file if the node address and frame type are not correct.

3 Remove the *OS/2 Requester* diskette and restart the PC.

This completes the procedure for installing the OS/2 client driver for NetWare.

Installing a NetWare Server Driver

This section contains information about installing the TLNKPODI.LAN NetWare server driver for the 3C359 NIC in the following environments:

- NetWare 3.12
- NetWare 4.1x

The driver and associated files are located in the \NETWARE\NWSERVER directory on *TokenDisk* diskette #1.

Driver Support

The TLNKPODI server driver is a high-performance NetWare 4.1x-compliant server driver. It can be used in the following environments:

- NetWare 4.1x servers
- NetWare 3.12 servers
- NetWare servers running SFT III in NetWare 4.1 (as an IPX link, not as a mirrored server link)



The term "NetWare 4.1x-compliant" server driver in this file means that the HSM (hardware-specific module, or server driver) meets the Open Data-Link Interface (ODI) 3.3 specification. Netware 3.12 servers using ODI 3.3 drivers need updated files from Novell. If you are installing the driver in a NetWare 3.12 server, download the LANDR9 and 312PTA.EXE files from Novell's Web site.

Installation Instructions

This section has instructions for installing TLNKPODI in two ways:

- On a file server in an existing NetWare environment running NetWare 3.12 or 4.1x. These instructions also apply to a new installation or upgrade to NetWare 3.12.
- As part of a new NetWare 4.1x installation or an upgrade to NetWare 4.1x.



Instructions in this section are written for TokenDisk diskettes. If you are using the TokenDisk CD, substitute the appropriate path where required.

Installing the Driver in an Existing NetWare Environment

This section explains how to install TLNKPODI on a file server already running NetWare 3.12 or 4.1x. The instructions in this section should also be used for a new NetWare 3.12 installation or an upgrade to NetWare 3.12.

If you are in the process of upgrading to NetWare 4.1x, proceed to "Installing the Driver as Part of a New Server Installation or Upgrade to NetWare 4.1x."

TokenDisk diskette #1 contains the server driver and versions of Novell NetWare Loadable Modules (NLMs) required for all NetWare 4.1x-compliant server drivers. You must use these NLMs, or more recent versions, with TLNKPODI.

Table 3-1 shows the names, locations, and versions of the support modules.

Table 3-1 Location of NetWare Support Modules

NetWare Version	Directory
4.1x	\NETWARE\NWSERVER\4.1x\MSM.NLM \NETWARE\NWSERVER\4.1x\NBI.NLM \NETWARE\NWSERVER\4.1x\TLNKPODI.INF \NETWARE\NWSERVER\4.1x\TLNKPODI.LAN \NETWARE\NWSERVER\4.1x\TLNKPODI.LDI \NETWARE\NWSERVER\4.1x\TOKENSM.NLM
3.12	\NETWARE\NWSERVER\3.12\MSM31X.NLM \NETWARE\NWSERVER\3.12\NBI31X.NLM \NETWARE\NWSERVER\3.12\TLNKPODI.LAN \NETWARE\NWSERVER\3.12\TOKENSM.NLM

Deciding If Modules Need to Be Replaced At the server command prompt, enter MODULES. The resulting display shows what drivers and modules are currently running on the server. Locate the entries for MSM.NLM and TOKENSM.NLM. (MSM31X.NLM appears as MSM.NLM.)

If any of the versions currently running is earlier than 2.50, you must replace modules MSM31X.NLM, MSM.NLM, or TOKENSM.NLM.

The modules on *TokenDisk* diskette #1 are version 2.50. You can load the server driver as described later in this chapter in "Using the Load Command."



CAUTION: Using versions of MSM.NLM, MSM31X.NLM, and TOKENSM.NLM earlier than 2.50 with TLNKPODI.LAN prevents the driver from loading.

Replacing Support Modules To replace support modules with more recent versions, use the steps below to load the support modules from the *TokenDisk* diskette and copy them to the file server.

- 1 Use the Unload command from the console command prompt to unload any existing server drivers that depend on the support modules you need to replace.**

This command will completely unload the drivers from memory and will terminate communication with currently attached network users.

The format of the command is:

```
unload <driver_name>
```

- 2 Unload the support modules by entering the commands in the order shown below:**

```
unload tokensm
```

```
unload msm
```

- 3 Load the support modules from *TokenDisk* diskette #1. Enter the following commands when the diskette is in drive A. Use a different drive if necessary:**

NetWare 4.1x servers:

```
load a:\netware\nwserver\4.1x\msm
```

```
load a:\netware\nwserver\4.1x\tokensm
```

NetWare 3.12 servers:

```
load a:\netware\nwserver\3.12\msm31x
load a:\netware\nwserver\3.12\tokentsm
load a:\netware\nwserver\3.12\monitor
```

Copying Support Modules and the Driver to the File Server

This section explains how to copy support modules and TLNKPODI.LAN to the file server. If you have replaced existing support modules, follow this procedure, so that the most current versions of the support modules load whenever you load a server driver.

The SYS volume on the file server must be mounted, you must have rights to copy files to the SYS:SYSTEM directory, and at least one server driver must be loaded and bound to a protocol.

- 1 Locate a workstation with a diskette drive. This workstation must allow you to log in to the file server to which you will copy the NLMs.**
- 2 Log in to the file server. Insert *TokenDisk* diskette #1 in the drive and copy the support files to the server.**

If drive F is mapped to the SYS volume, the sample commands shown below copy files from a diskette in the workstation's drive A to a NetWare 4.1x file server:

```
copy a:\netware\nwserver\4.1x\msm.nlm f:\system
copy a:\netware\nwserver\4.1x\tokentsm.nlm f:\system
```

- 3 Enter the following command to copy the TLNKPODI.LAN server driver to F:SYS:SYSTEM:**

```
copy a:\netware\nwserver\4.1x\tlnkpodi.lan f:\system
```

Using the Load Command You can enter the Load command from the server's console command prompt or you can include it in your AUTOEXEC.NCF file to load the driver automatically when you start the SERVER program. The format of the command is shown below:

```
load <path>\tlnkpodi <parameter_list>
```

where <path> is the full pathname to the location of TLNKPODI.LAN, if it is not at SYS:SYSTEM.

Each Load command must be entered on a separate, single line.

Table 3-2 summarizes the Load parameters that can be used with TLNKPODI.LAN. Detailed descriptions of the parameters begin after the table.

Table 3-2 TLNKPODI.LAN Load Parameters

Parameter	Units	Supported Values	Description
SLOT=	Decimal	Value assigned by PCI BIOS	Sets the slot number prompts.
FRAME=	Text	TOKEN-RING	Specifies the frame types supported on the network. Default = TOKEN-RING
NODE=	Hex	See detailed description in text.	Overrides the default node ID. Default = stored on board the NIC
NAME=	Any	N/A	Sets the optional logical board name (17 characters maximum). Default = absent

SLOT=<value> Required if there is more than one 3C359 NIC installed in the server; you will be prompted to supply a value if you do not enter one. This parameter specifies the slot number for the NIC. The slot number is automatically assigned by the PCI BIOS.

There are two ways you can supply a slot number for the NIC:

- Enter a value when prompted by the server.
- Manually find the slot number by loading the driver as described later in this chapter in "Finding the Slot Number Manually."

Regardless of the method you choose, you must supply a slot number for each 3C359 NIC installed in the server. Once you have noted the slot number of each NIC, you can include the Load and Bind commands in the server's AUTOEXEC.NCF file so the driver will be automatically loaded when you start the SERVER program.

After a server driver has been loaded, you can view the configuration of each driver (including Load command parameters) using the CONFIG command from the server console command prompt.



At system boot, the PCI BIOS determines slot numbers for all PCI NICs. Adding or removing PCI NICs can cause the slot numbers of all other PCI NICs to change. Therefore, after adding or removing PCI NICs in your machine, you should verify the slot numbers used by all PCI NICs (including the 3C359 NIC) and change the Load command SLOT= parameters for them accordingly.

FRAME=<type> Specifies the frame type used by this logical board. (A "logical board" means a particular instance of loading the server driver.)

You do not need to include this parameter if you will be using only the default frame type, TOKEN-RING. But you must make sure the server driver is configured for all frame types used on the network.

If you want to use both frame types, you must load the driver twice, as shown below:

```
load tlknpodl slot=<value> frame=token-ring
load tlknpodl slot=<value> frame=token-ring_snap
```

NODE=<node-ID> Specifies that the locally administered node ID parameter overrides the default globally administered node ID stored on the NIC. The node ID is a hexadecimal number in the range 400000000000h to 40007FFFFFFFh (the range of locally administered node IDs permitted under IEEE guidelines). The node address you select must be unique. For example:

```
node=4000123AB678
```

NAME=<name> An optional name for identifying this logical board. NAME is commonly used when you bind a protocol to the driver. This parameter is limited to 17 alphanumeric characters and must be unique among all logical boards in the file server.

Finding the Slot Number Manually This section shows how to manually determine the slot numbers of two 3C359 NICs installed in a file server. You do not need to take these actions if you want to enter the slot numbers when prompted by the server.

The samples below show the server console display when two 3C359 NICs are installed.

This is the Load/Bind sequence for the first of two NICs:

```
FS1:load c:tlmkpodi
Loading module tlmkpodi.lan
  3Com TokenLink PCI Server MLID
  Version 1.00c [date]
  (C) Copyright 1993-97, 3Com Corp. All
  rights reserved
Supported slot values are 1,2
Slot: 1
Data Rate = 16 Mbps.
Max Packet Size = 17954
IO Address Base = F480
Memory Basic Address = FF9EFE800
IRQ = 10
Number of transmit buffers (DPDs) configured = 5.
Number of receive buffers (UPDs) configured = 3.
MicroCode Version String = 01.20 10/20/97
```



The supported slot values shown are for the two 3C359 NICs in the server. The next line is where you enter the address that you will use.

This is the Load/Bind sequence for the second of two NICs:

```
FS1:load c:tlmkpodi
Do you want to add another frame type for a
previously loaded board? n
Supported slot values are 4
Slot: 4
Data Rate = 16 Mbps.
Max Packet Size = 17954
IO Address Base = EC80
Memory Basic Address = FFDFFC00
IRQ = 11
Select board to bind:2
IPX LAN protocol bound to 3Com 3Com TokenLink
PCI Server MLID FS1:
```

Once you have determined the values for the NICs installed in the server, you can use the SLOT= parameter to load the driver either from the command line or by placing the load command in the AUTOEXEC.NCF file to load automatically each time the server is started.

Using the Bind Command After loading the driver, use the Bind command to bind each NIC to a protocol. Enter the command from the server console command prompt, or include the command in the AUTOEXEC.NCF file to automatically bind the driver when you start the SERVER program.

```
bind {ipx | ip} [to] <name | drivename>  
      {net=<number> | addr=<number>}
```

IPX | IP The name of the protocol to which you are binding the driver (IPX or IP). If you specify IP, other parameters are required; consult your TCP/IP documentation for more information.

Name (Optional.) The name you assigned to the logical board with the Load command. If you use a logical board name, do not specify DRIVENAME.

Drivename The name of the driver you are using. Do not use Drivename if you assigned a logical board name with the NAME parameter.

NET=<number> (IPX protocol only.) The unique IPX internal network number you have assigned to this network. It is a hexadecimal number up to eight characters long. For example:

net=5A

ADDR=<number> (TCP/IP protocol only.) The NIC's network address. The address must be unique on the internetwork. For example:

addr=192.45.67.8

To view the current configuration, enter the CONFIG command at the server's console command prompt.

Installing the Driver as Part of a New Server Installation or Upgrade to NetWare 4.1x

This section has instructions for loading TLNKPODI.LAN as part of a new NetWare server installation or an upgrade to NetWare 4.1x. The procedure shows the essential steps for installing the server driver only. For most installations, other steps will be required; consult your Novell documentation for information about any procedures not described below.

- 1 At the *Load LAN Driver* menu, insert *TokenDisk* diskette #1 into the drive and press **Alt+Esc** to switch from the Install program to the server console command prompt.**

- 2 Enter the following commands at the server console command prompt:**

```
unload tokentsm  
unload msm
```

- 3 From *TokenDisk* diskette #1, load the support modules required to run the server driver. Enter the following commands at the server console command prompt in the order shown:**

```
load a:\netware\nwserver\4.1x\msm  
load a:\netware\nwserver\4.1x\tokentsm
```

Typically, the modules that ship with NetWare 4.1x are an earlier version than 2.50. It is recommended that you use MSM.NLM and TOKENTSM.NLM version 2.50 or later with TLNKPODI.LAN.

- 4 Press **Alt+Esc** to return to the Install program.**
- 5 Press **Insert** to load an unlisted LAN driver, and then follow the prompts to specify the driver load path.**

- 6 At the next menu, enter the following path:**

```
a:\netware\nwserver
```

After a short delay, a menu appears, showing the TLNKPODI.LAN driver.

- 7 Press **Enter** to select the TLNKPODI.LAN driver.**
- 8 When asked if you want to copy the driver (to **SYS:SYSTEM**), respond **Yes**.**

The next menu shows the parameters that can be used with the 3C359 token ring NIC driver.

9 Press Enter to view a list of supported options for the selected parameter.

Additional help for the parameter is also displayed in the lower text box. You can also find a description of parameters and explanations earlier in this chapter in "Using the Load Command."

10 After you have made selections for all 3C359 NIC driver parameters, press F10 to save the parameters and load TLNKPODI.LAN. Then follow the prompts to complete the server installation.

11 After completing the installation, copy the support modules MSM.NLM and TOKENTSM.NLM from *TokenDisk* diskette #1 to the server's SYS:SYSTEM directory.

Doing so causes the support modules to be auto-loaded by any of the server drivers, such as TLNKPODI.LAN. See "Copying Support Modules and the Driver to the File Server" earlier in this chapter for instructions.

Unbind and Unload Commands You can use the Unbind or Unload commands to remove a driver (or logical board). The commands have the format shown below:

```
unbind ipx tlnkpodi <name>  
unload tlnkpodi
```

The Unbind command requires only that you reenter the Bind command, and does not affect the Load command. You can selectively unbind a protocol for a particular logical board by specifying a board name, as shown in the command sample.

The Unload command completely unloads the driver from memory. If you wish to reload the driver, you will be required to use the Load and Bind commands.



4

MICROSOFT WINDOWS ENVIRONMENT

This chapter describes how to install a 3C359 NIC network device driver for various Microsoft Windows environments.

Drivers Available for Windows

3Com provides the following network device drivers for the 3C359 NIC in these Microsoft Windows environments:

- NDIS 4 miniport driver
- NDIS 3 miniport driver

NDIS 4 Miniport Driver

The NDIS 4 driver conforms to Microsoft's latest NDIS 4.0 miniport specification and supports the following Windows environments:

- Windows 95 (version 950b, OSR2)
- Windows 98 (PC 97 specification)
- Windows NT 4.0

The NDIS 4 driver provides the following 3C359 NIC capabilities:

- DynamicAccess Class of Service (Traffic Prioritization)



Although the NDIS 4 miniport driver is compatible with Windows 95 (version 950b, OSR2), it does not currently provide Class of Service support for this version of Windows 95.

- Auto ring speed detection
- Promiscuous mode
- Locally administered network address (LAA) selection

Class of Service is disabled by default. You can enable this DynamicAccess feature during installation.

Auto ring speed detection is enabled by default during NDIS 4 driver installation. You can disable this feature during installation if desired.

Promiscuous mode is automatically enabled and controlled for the 3C359 NIC by applications that require this feature. No user control is necessary.

You can assign a locally administered address (LAA) that overrides the NIC's universal address "burned-in" during manufacturing.

NDIS 3 Miniport Driver

The NDIS 3 miniport driver is compatible with Microsoft's NDIS 3.x miniport specification, and supports the following Windows environments:

- Windows 95 (version 950 and version 950b, OSR2)
- Windows NT 3.51



The NDIS 3 driver supports all the 3C359 NIC features listed in the preceding section for the NDIS 4 driver except DynamicAccess Class of Service.

Installing a 3C359 NIC Driver for Windows Environments

This section describes installing drivers for the following operating system environments:

- Windows 95 version 950
- Windows 95 version 950b (OSR2)
- Windows NT 4.0
- Windows NT 3.51

Before Installing a Windows Driver

Before you install a Windows driver, make sure that the 3C359 NIC is inserted in the PC as described in Chapter 2, and that Windows is installed.



Have the Windows software accessible on diskettes, CD, or hard drive in case the installation utility requests protocol files from the Windows software library.

If your network environment uses the TCP/IP communications protocol, you must obtain from your network administrator all the information you will need to define an IP address during the installation process.

Installing a Driver for Windows 95

This section describes installing the 3C359 NIC NDIS 4 driver or NDIS 3 driver for the following Microsoft Windows 95 versions:

- Version 950 (950a, or “retail” version)
- Version 950b (OEM Service Release 2, or OSR2)

About Microsoft Windows 95 Versions

The 3C359 NIC NDIS 4 driver installation procedures differ depending on the Windows 95 version installed on your PC.

Version 950 of Windows 95 If your PC did not come with Windows 95 already installed, you must install version 950 of Windows 95 (950a, or “retail” version) before you install the driver. Version 950 of Windows 95 is designed to upgrade Windows 3.x PCs.

Version 950b (OSR2) of Windows 95 Some PCs are sold with a special Windows 95 version already installed. Windows 95 OEM Service Release 2 (OSR2) is version 950b of Windows 95. An OEM Service Release is an updated version of a Microsoft product for PC original equipment manufacturers (OEMs) to preinstall on new PCs. Windows 95 version 950b contains some new hardware support and programs.

Finding the Windows 95 Version To determine which Windows 95 version you are using, open the Control Panel, select *System*, and read the System information under the General tab. If your release is version 4.00.950 (or 4.00.950a), you are using the “retail” version of Windows 95 (version 950). If your release is version 4.00.950b, you are using the OSR2 version of Windows 95 (version 950b).

Installing a Driver for Windows 95 Version 950

Follow these steps to install the NDIS 3 driver for Windows 95 (version 950). It is assumed that you have completed the 3C359 NIC installation procedure described in Chapter 2.

1 Turn on the computer and start Windows 95.

Windows 95 automatically detects the new hardware in the PC. Windows 95 displays the New Hardware Found window.

2 Select *Driver from disk provided by hardware manufacturer* and click *OK*.

Windows 95 displays the Install from Disk dialog box, which prompts you to insert the appropriate disk and to enter the directory location for the NDIS 3 driver.

3 If you are using the 3.5-inch diskettes, insert *TokenDisk* diskette #2 in the drive. If you are using the *TokenDisk* CD, insert it in the CD-ROM drive.

4 At the prompt, enter the appropriate path for the drive containing your *TokenDisk* diskette or CD and the NDIS 3 driver. For example:

a: \w95nt351

5 Click *OK*.

If Windows 95 prompts you to insert the Windows 95 CD or diskettes to obtain files from the Windows 95 software library, insert the appropriate diskette or CD and continue as directed by the prompts.

6 When the setup file has been read, select *TokenLink Velocity XL PCI NIC* on the list and click *OK*.

Windows 95 imports the driver, and the driver installation is complete.

7 Remove the *TokenDisk* diskette or *TokenDisk* CD and restart your computer.

This concludes the procedure for installing the NDIS 3 driver for Windows 95 (version 950).

Installing a Driver for Windows 95 Version 950b, OSR2

Follow these steps to install the driver for Windows 95 version 950b, OSR2. It is assumed that you are already running Windows 95.

During installation, have the Windows 95 software accessible on diskettes, CD, or hard drive in case the installation utility requests files from the Windows 95 software library.

1 Install the 3C359 NIC and start the computer.

Windows 95 detects the new hardware. *PCI Token Ring Controller* appears in the New Hardware Found dialog notice. The Update Device Driver Wizard dialog box appears.

2 Click *Next*.

3 Click *Other Locations*.

The Select Other Location dialog box appears.

4 If you are using 3.5-inch diskettes, insert *TokenDisk* diskette #2 in the drive. If you are using the *TokenDisk* CD, insert it in the CD-ROM drive.

5 At the prompt, enter the appropriate path for the drive containing your *TokenDisk* diskette or CD and the driver you want to install.

For example, use the following path to install the NDIS 4 driver (recommended) from the *TokenDisk* diskette:

a:\w98nt40

Use the following path to install the NDIS 3 driver from the *TokenDisk* diskette:

a:\w95nt351

If you are using the *TokenDisk* CD, substitute the appropriate drive in the path.

6 Verify that the Update Device Driver Wizard dialog box lists *3Com TokenLink Velocity XL PCI Adapter*, and click *Finish*.

Have the Windows 95 software accessible in case the installation utility requests files from the Windows 95 software library. Insert the appropriate diskette or CD if prompted to do so.

Messages appear while files are being copied. The System Settings Change dialog box appears.

7 Remove the *TokenDisk* diskette or CD from the drive.

8 Click *Yes* to restart the computer.

This concludes the procedure for installing a driver for Windows 95 version 950b, OSR2.

To disable auto ring speed detection and manually select the ring speed, see "Setting Ring Speed for Windows 95" for more details.

To define a locally administered network address, see "Defining the LAA Address for Windows 95" for more details.

Installing a Driver for Windows NT 4.0

Follow these steps to install the 3Com NDIS 4 driver for Windows NT 4.0.



If your network environment uses the TCP/IP communications protocol, obtain from your network administrator all the information you need to define an IP address during the installation process before starting.

- 1 In the My Computer group, double-click the *Control Panel* icon.**
- 2 In the Control Panel group, double-click the *Network* icon.**
- 3 In the Network dialog box, click the *Adapters* tab.**
- 4 In the Adapters tab, click *Add*.**
- 5 In the Select Network Adapter dialog box, click *Have Disk*.**

The Insert Disk dialog box appears.

- 6 If you are using the 3.5-inch diskettes, insert *TokenDisk* diskette #2 in the drive. If you are using the *TokenDisk* CD, insert it in the CD-ROM drive.**
- 7 Accept the displayed default path by clicking *OK*.**

For example, if you are using the 3.5-inch diskettes, the following path is displayed:

a:

This path identifies the location of the NDIS 4 driver files for Windows NT 4.0. The Select OEM Option dialog box appears.

- 8 Select 3Com TokenLink Velocity XL PCI Adapter and click OK.**
- 9 Verify that 3Com TokenLink Velocity XL PCI Adapter appears in the list in the Network Adapters tab and click Close.**



If your network environment uses the TCP/IP communications protocol, the Microsoft TCP/IP Properties dialog box is displayed. You must obtain from your network administrator all the information you need to define an IP address during the installation process. Continue after you have defined the NIC for TCP/IP.

Bindings messages appear, followed by a prompt to restart the computer.

- 10 Remove the *TokenDisk* diskette or CD from the drive.**
- 11 Click Yes to restart the computer.**

This concludes the procedure for installing the NDIS 4 driver for Windows NT 4.0.

To disable auto ring speed detection and manually select the ring speed, see "Setting Ring Speed for Windows NT 4.0" for more details.

To define a locally administered network address, see "Defining the LAA Address for Windows NT" for more details.

To select applications for high-priority network access, see "Configuring Class of Service" for more details.

Installing a Driver for Windows NT 3.51

Follow these steps to install the NDIS 3 driver for Windows NT 3.51.

- 1 If you are using the 3.5-inch diskettes, insert *TokenDisk* diskette #2 in the drive. If you are using the *TokenDisk* CD, insert it in the CD-ROM drive.**
- 2 In the Main group, double-click the *Control Panel* icon.**

- 3 In the Control Panel group, double-click the **Network** icon.
- 4 In the Network Settings dialog box, click **Add Adapter**.
- 5 In the Add Network Adapter dialog box, scroll to the bottom of the Network Adapter Card selection list. Select **<Other> Requires disk from manufacturer**.
- 6 Click **Continue**.
- 7 Accept the displayed default path by clicking **OK** to select the NIC.

For example, if you are using the 3.5-inch diskettes, the following path is displayed:

a:

This path identifies the location of the NDIS 3 driver files for Windows NT 3.51.

The driver files are copied to the C drive. A prompt appears, asking if you want to restart your computer.

- 8 Remove the **TokenDisk** diskette or CD and click **Restart now**.

This concludes the procedure for installing the NDIS 3 driver for Windows NT 3.51.

Selecting Ring Speed

This section describes how to set the ring speed for Windows 95 and Windows NT environments.

Setting Ring Speed for Windows 95

The auto ring speed detection option permits the 3C359 NIC's NDIS 4 driver to detect and operate at the current ring data rate. Auto ring speed detection is automatically enabled when you load the NDIS 4 driver for Windows 95.

You can choose one of the following ring speed options:

- Enable auto ring speed detection (default setting)
- Disable auto ring speed detection and manually set the NIC ring speed to 16 Mbps or 4 Mbps

To access the ring speed option in a Windows 95 environment, follow these steps:

- 1 **In the My Computer group, double-click the *Control Panel* icon.**
- 2 **In the Control Panel group, double-click the *Network* icon.**

The Network window appears, as shown in Figure 4-1.

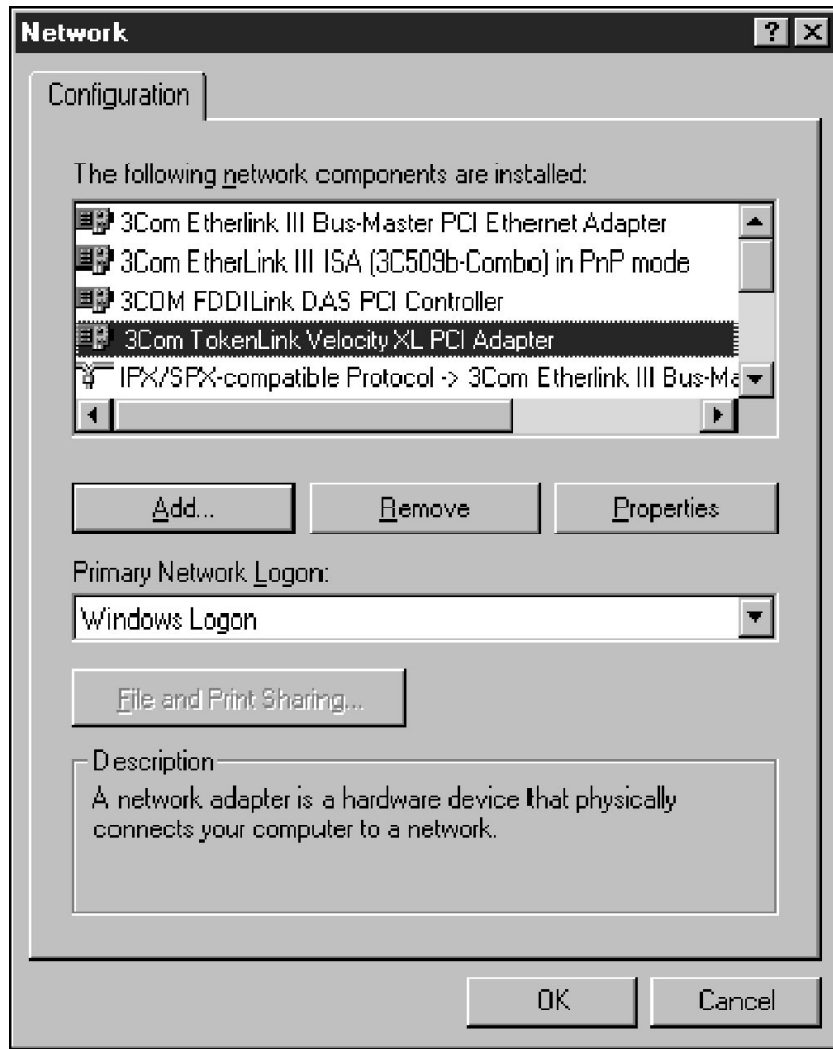


Figure 4-1 Network Window

- 3 **In the Configuration tab, select *3Com TokenLink Velocity XL PCI Adapter* and click *Properties*.**

The Driver tab of the 3Com PCI Token Ring Adapter Properties window appears, as shown in Figure 4-2.

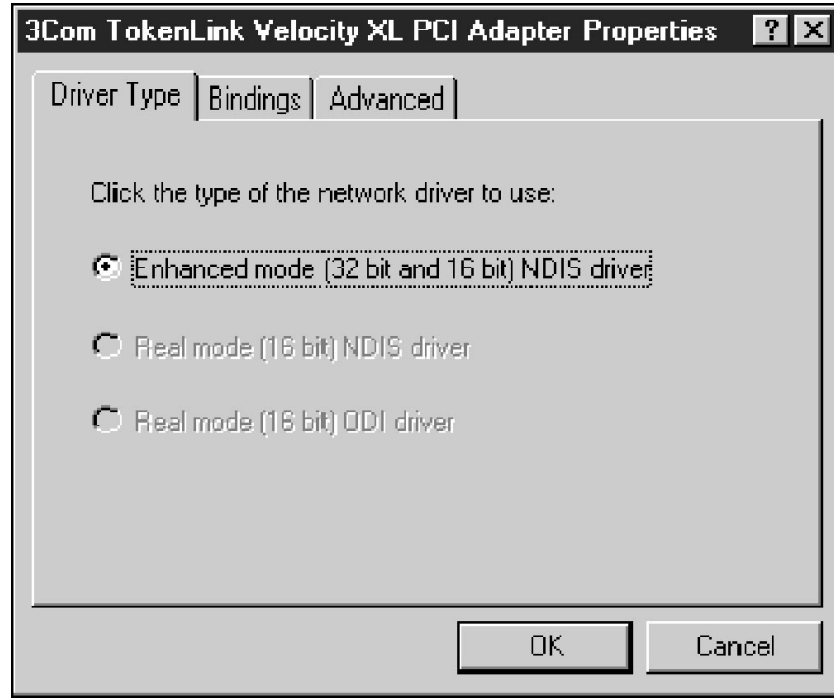


Figure 4-2 PCI Token Ring Adapter Properties Window: Driver Tab

4 Click the Advanced tab.

The Advanced tab of the 3Com PCI Token Ring Adapter Properties window appears, as shown in Figure 4-3.

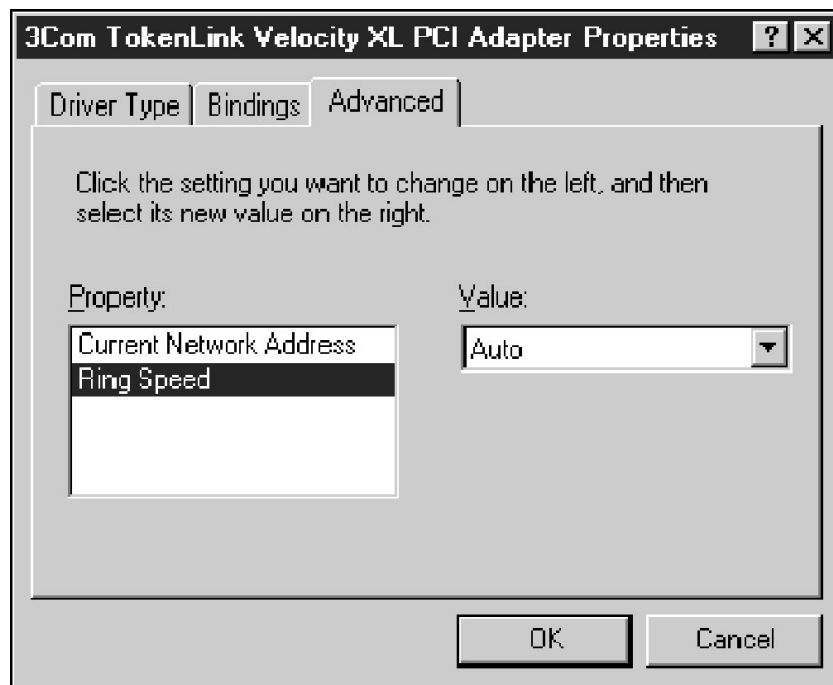


Figure 4-3 Displaying Ring Speed Setting

The default setting for *Ring Speed* is *Auto*.

- 5 To manually set the ring speed, select **Ring Speed** in the **Property** list.
- 6 Position the mouse pointer on the down arrow button in the **Value** field. Press and hold down the left mouse button.

The **Advanced** tab appears, as shown in Figure 4-4.

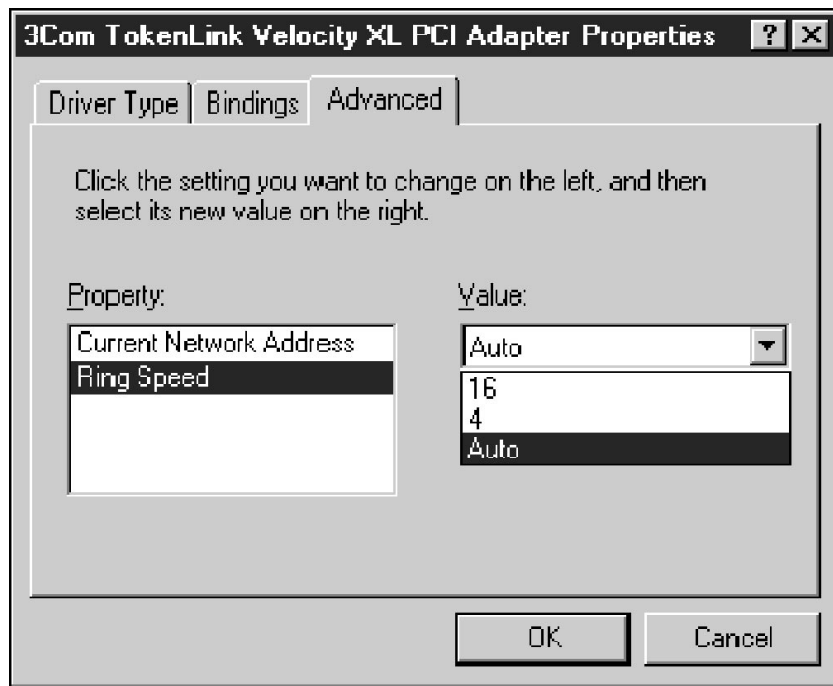


Figure 4-4 Manually Setting Ring Speed

- 7 **Select one of the following values:**
 - **16** — Disables auto ring speed detection and sets NIC ring speed at 16 Mbps
 - **4** — Disables auto ring speed detection and sets NIC ring speed at 4 Mbps
 - **Auto** — Allows NIC to automatically detect ring speedYour selection overrides the factory setting for the 3C359 NIC and any setting made through the DOS Configuration and Diagnostic Program.
- 8 **Click *OK*.**

Setting Ring Speed for Windows NT 4.0

Auto ring speed detection permits the 3C359 NIC's NDIS 4 driver to detect and operate at the current ring data rate. Auto ring speed detection is automatically enabled when you load the NDIS 4 driver for Windows NT 4.0.

You can choose the following ring speed options:

- Enable auto ring speed detection (default setting)
- Disable auto ring speed detection and manually set the NIC ring speed to 16 Mbps or 4 Mbps

To access the ring speed detection option in a Windows NT environment, follow these steps:

- 1 In the My Computer group, double-click the *Control Panel* icon.**
- 2 In the Control Panel group, double-click the *Network* icon.**
- 3 In the Network dialog box, click the *Adapters* tab.**
- 4 In the Adapters tab, select *3Com TokenLink Velocity XL PCI Adapter* and click *Properties*.**

The 3Com TokenLink Velocity XL PCI Adapter dialog box appears, as shown in Figure 4-5.

- 5 To manually set the ring speed, position the mouse pointer on the down arrow button in the *Ring Speed Detection* field. Press and hold down the left mouse button to display the available options.**

The ring speed detection menu displays the current ring speed options, as shown in Figure 4-5.

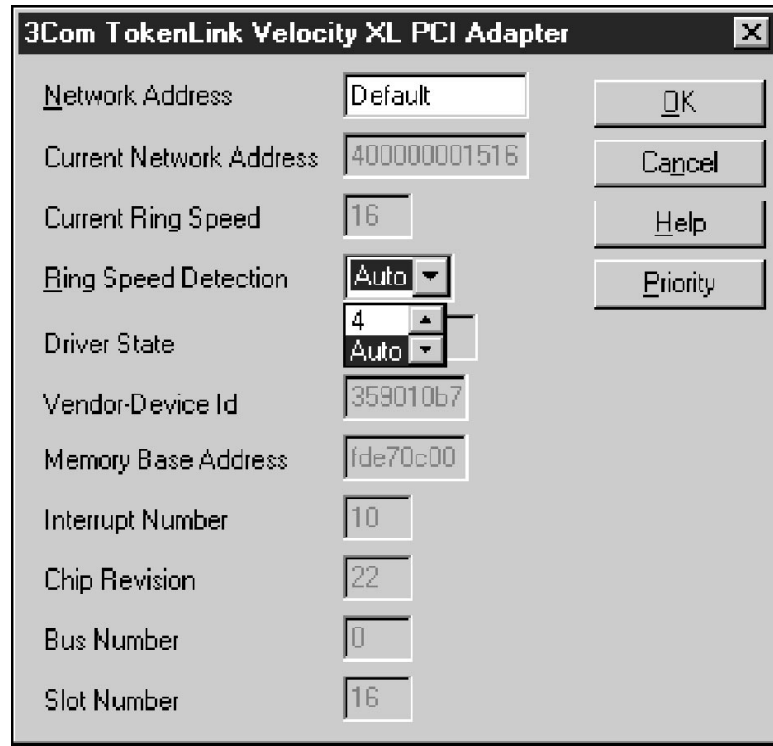


Figure 4-5 3Com TokenLink Velocity XL PCI Adapter Dialog Box

6 Select one of the following values:

- **16** — Disables auto ring speed detection and sets NIC ring speed at 16 Mbps
- **4** — Disables auto ring speed detection and sets NIC ring speed at 4 Mbps
- **Auto** — Allows NIC to automatically detect ring speed

7 Click OK.



You can click the Priority button to access the DynamicAccess: Select Adapter window (Figure 4-11) to enable and configure Class of Service. For more information about Class of Service, see "Configuring Class of Service" later in this chapter.

This concludes the procedure for setting the 3C359 NIC ring speed in a Windows NT 4.0 environment.

Defining a Locally Administered Network Address

A default network address is encoded for the 3C359 NIC during manufacturing. This address is called the universal address (UAA), or “burned-in” address.

To customize the address for your network administration needs, you can assign a locally administered address (LAA) that overrides the NIC’s universal address. The LAA address must consist of 12 hexadecimal digits in the range from X’4000 0000 0000’ to X’7FFF FFFF FFFF’ and must be unique throughout the network.

In most cases, you will use the preset UAA address and not have to define an LAA address. Check with your network administrator before using this feature.

Defining the LAA Address for Windows 95

Use the following procedures in this section to perform the following actions in a Windows 95 environment:

- Display the current network address
- Set a new LAA address.

Displaying the Current Network Address for Windows 95

Follow these steps to display the current network address:

- 1 Boot from a DOS diskette to run the diagnostic program. Display the DOS prompt.**
- 2 If you are using the 3.5-inch *TokenDisk* diskettes, insert *TokenDisk* diskette #1 in the drive and make that drive the active drive. For example, enter:**
a:
If you are using the *TokenDisk* CD, insert it and make the CD-ROM drive the active drive. For example, enter:
d:

3 Enter the following command:

3pcid

The Configuration and Diagnostic Program window is displayed, as shown in Figure 4-6.

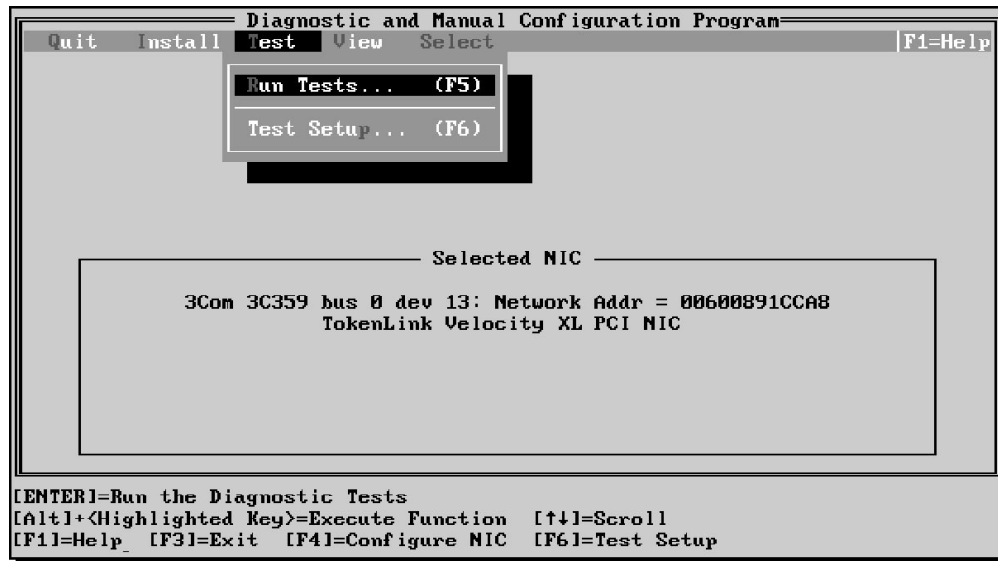


Figure 4-6 Configuration and Diagnostic Program Window

4 Record for future reference the 12-digit universal token ring address displayed in the Configuration and Diagnostic Program window. For example:

Network Addr = 00600891CCA8

Setting the LAA Address for Windows 95

To set a locally administered address for a Windows 95 environment, follow these steps:

- 1 In the My Computer group, double-click the **Control Panel** icon.
- 2 In the Control Panel group, double-click the **Network** icon.

The Network window appears, as shown in Figure 4-7.

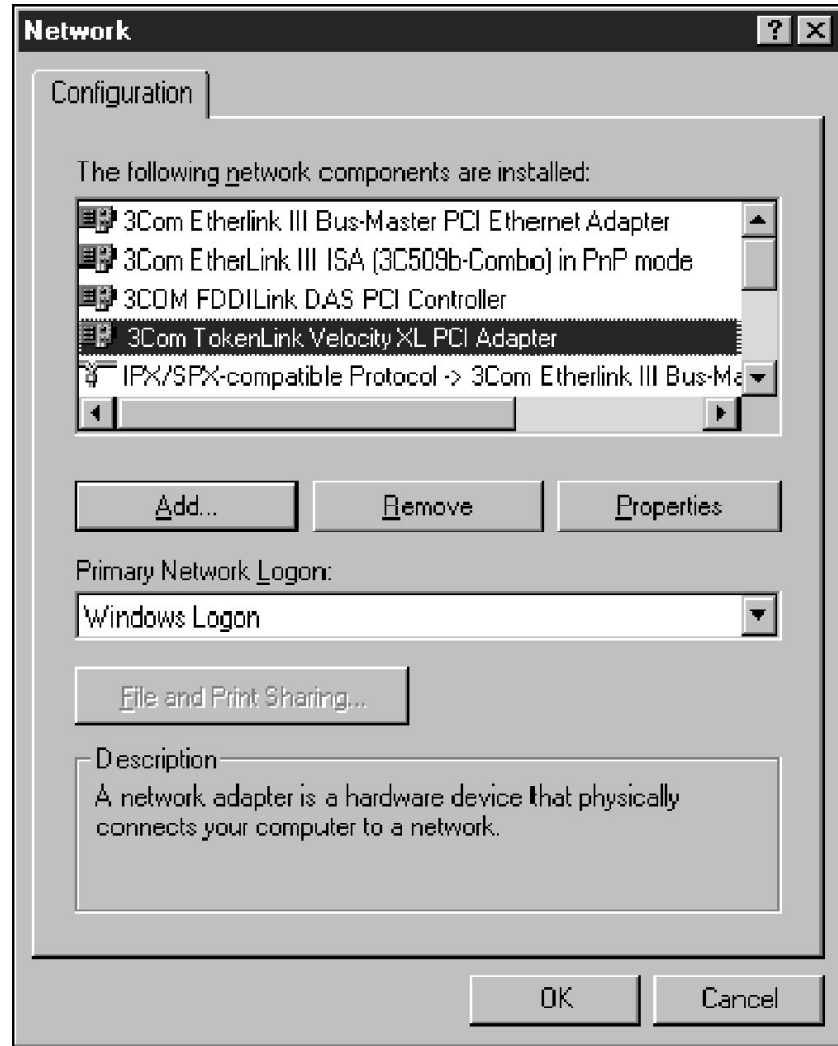


Figure 4-7 Network Window

3 In the Configuration tab, select 3Com TokenLink Velocity XL PCI Adapter and click Properties.

The Driver tab of the 3Com PCI Token Ring Adapter Properties window appears, as shown in Figure 4-8.

4 Click the Advanced tab.

The Advanced tab of the 3Com PCI Token Ring Adapter Properties window appears, as shown in Figure 4-9.

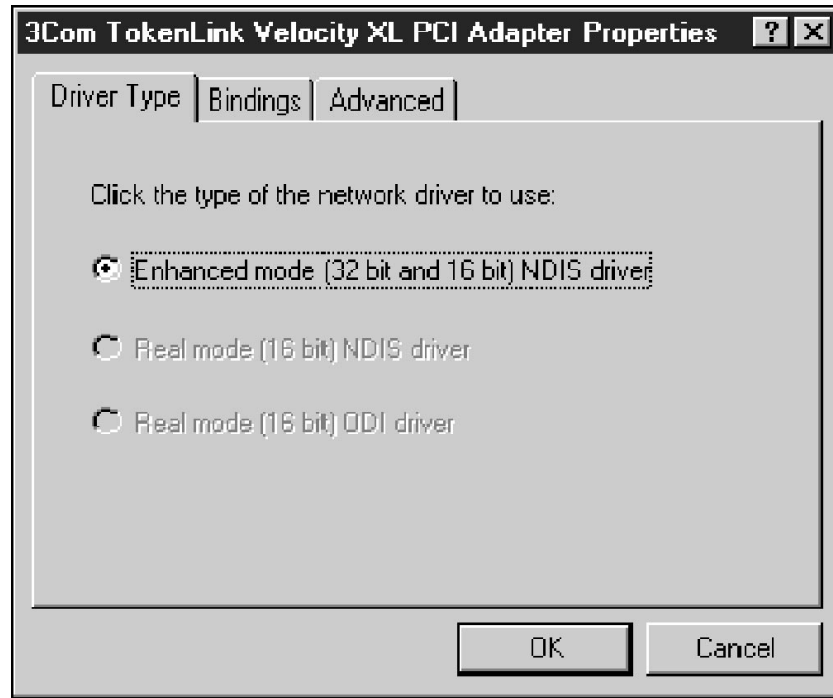


Figure 4-8 PCI Token Ring Adapter Properties Window: Driver Tab

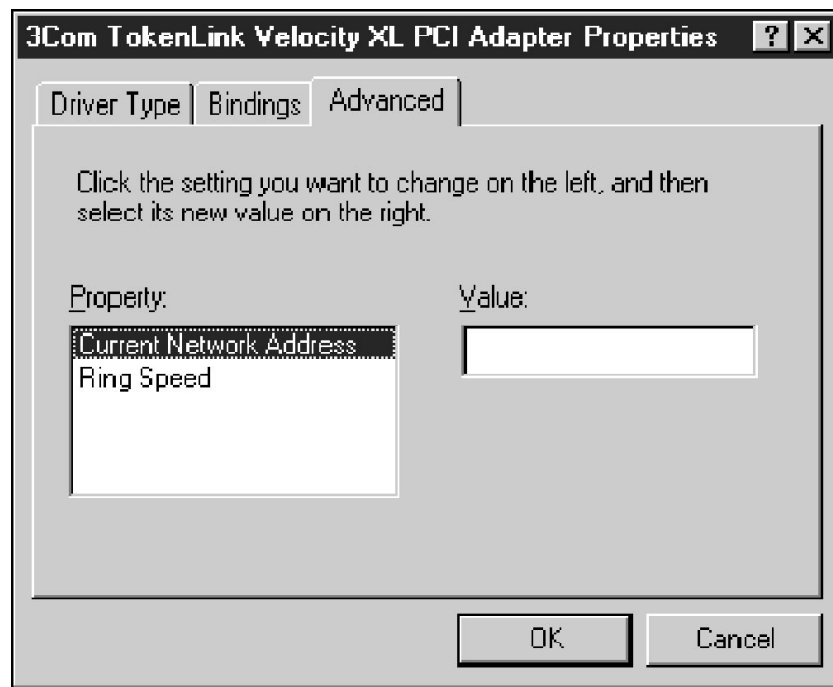


Figure 4-9 Entering Current Network Address

- 5 **Select *Current Network Address* in the *Property* list.**
- 6 **Enter a valid 12-digit locally administered address in the *Value* field.**

A valid 12-digit hexadecimal LAA value must fall within the range 400000000000h to 7FFFFFFFFFFFFh and must be unique throughout the network. Check with your network administrator for the appropriate LAA address.
- 7 **Click *OK*.**
- 8 **Restart the computer.**

Defining the LAA Address for Windows NT

To set a locally administered address for a Windows NT environment, follow these steps:

- 1 **In the *My Computer* group, double-click the *Control Panel* icon.**
- 2 **In the *Control Panel* group, double-click the *Network* icon.**
- 3 **In the *Network* dialog box, click the *Adapters* tab.**
- 4 **In the *Adapters* tab, select *3Com TokenLink Velocity XL PCI Adapter* and click *Properties*.**

The 3Com TokenLink Velocity XL PCI Adapter dialog box appears, as shown in Figure 4-10. Note that the current network address is displayed in the second field.

- 5 **Enter a valid 12-digit locally administered address in the *Network Address* field.**

A valid 12-digit hexadecimal LAA value must fall within the range 400000000000h to 7FFFFFFFFFFFFh and must be unique throughout the network. Check with your network administrator for the appropriate LAA address.

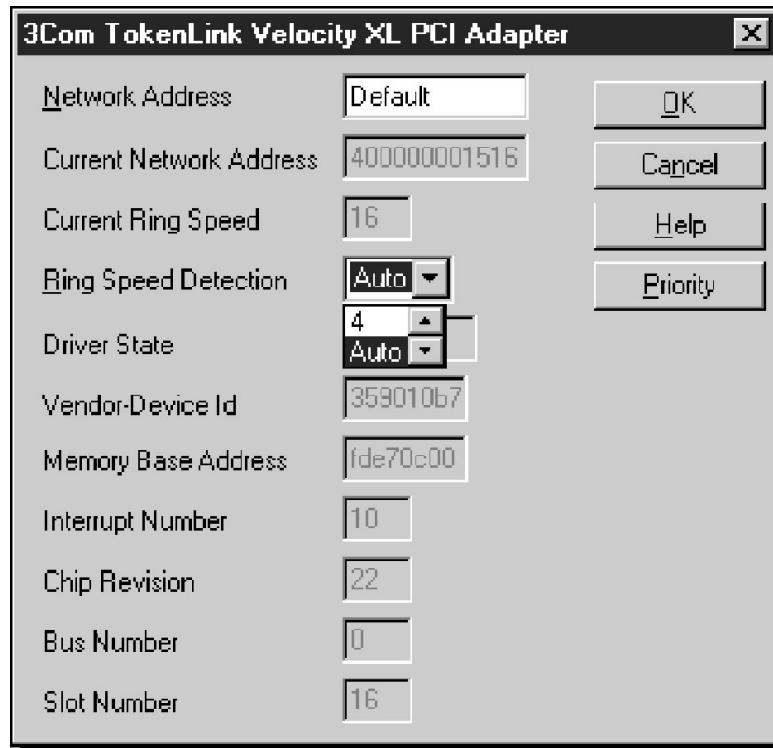


Figure 4-10 3Com TokenLink Velocity XL PCI Adapter Dialog Box

6 Click OK.

i You can click the Priority button to access the DynamicAccess: Select Adapter window (Figure 4-11) to enable and configure Class of Service. For more information about Class of Service, see "Configuring Class of Service" later in this chapter.

7 Restart the computer.

Configuring Class of Service

This section describes activating and configuring DynamicAccess Class of Service (Traffic Prioritization) support for Windows NT 4.0.

i Class of Service is available only with the 3C359 NIC NDIS 4 driver. This feature is not available with other 3C359 NIC drivers. Although the NDIS 4 miniport driver is compatible with Windows 95 (version 950b, OSR2), it does not currently provide Class of Service support for this version of Windows 95. The NDIS 4 miniport driver does provide Class of Service support for Windows 98.

Class of Service (Traffic Prioritization) is an IEEE 802.5 supported feature that lets you select critical applications for high-priority network access. Class of Service prioritization allows stations running critical applications under Windows NT 4.0 or Windows 98 to access network bandwidth before other stations. The NDIS 4 driver requests a priority token when the selected applications transmit data.

The Class of Service feature is disabled by default; if you want to take advantage of this feature, you must manually enable it after installing the NDIS 4 driver.

Before Starting Class of Service Configuration

The 3C359 NIC must be installed before you configure Class of Service. For NIC installation instructions, see Chapter 2, "Installing the 3C359 NIC."

The NDIS 4 driver must also be installed before you configure Class of Service. For installation instructions, see the earlier sections in this chapter.

Finally, you must also have installed the appropriate applications that you want to prioritize through Class of Service configuration.

Enabling Class of Service

The Class of Service feature is disabled by default. To enable Class of Service in a Windows NT 4.0 environment, follow these steps:

- 1 In the Control Panel group, double-click the *3Com Class of Service* icon.**

The DynamicAccess: Select Adapter window appears (Figure 4-11).



The 3Com Class of Service icon is loaded automatically with the NDIS 4 driver installation. In a Windows NT environment, you can also access the DynamicAccess: Select Adapter window by clicking the Priority button on the 3Com TokenLink Velocity XL PCI Adapter window (Figure 4-5).

- 2 **Select 3Com TokenLink Velocity XL PCI Adapter, as shown in Figure 4-11.**

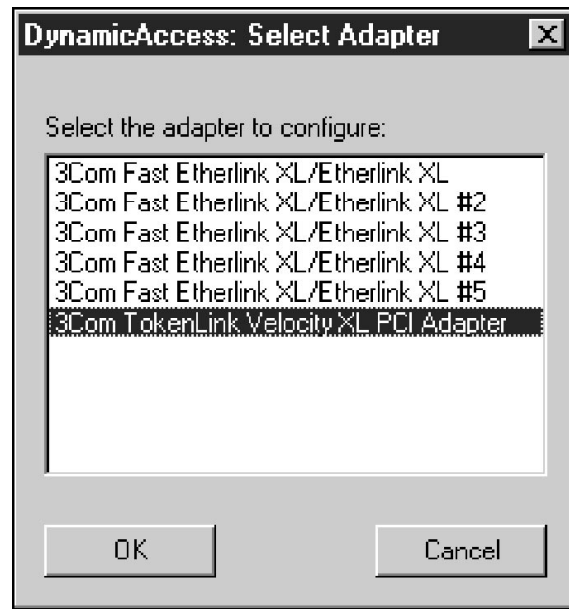


Figure 4-11 DynamicAccess: Select Adapter Window

- 3 **Click OK.**

The Supported Applications tab of the 3Com Class of Service Setup window appears, as shown in Figure 4-12. The Supported Applications tab automatically displays all applications on your PC that support DynamicAccess Class of Service.

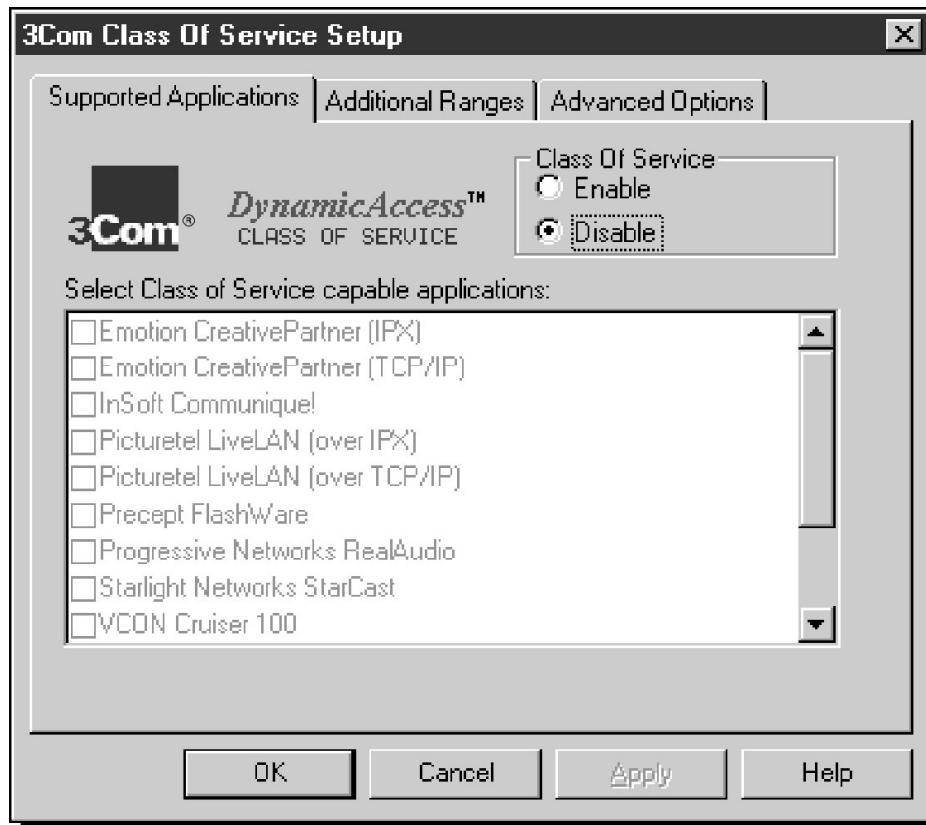


Figure 4-12 3Com Class of Service Setup Window



If an application is not listed in the Supported Applications tab (Figure 4-12), you can obtain the necessary port or socket range from the application's manufacturer, and manually enter the information in the Additional Ranges tab (Figure 4-13); or you can set the range to include all applications.

4 Select the *Enable* radio button.

The default mode is *Disable*. When Class of Service is disabled, you cannot select applications shown in the Supported Applications Tab for high-priority network access. In addition, you cannot make changes to data shown in the Additional Ranges tab and Advanced Options tab. Selecting *Enable* gives you access to all three tabs of the 3Com Class of Service Setup window.

5 Click the box next to each application that you want to have high-priority network access.

Class of Service divides applications into two network access priority groups:

- High-priority
- Low-priority (normal-priority)

Applications that you select are marked for high-priority network access. Unselected applications are given low-priority (normal-priority) network access.

Based on your selections, the NDIS 4 driver can recognize network traffic as high-priority when that traffic is generated by a chosen application.

6 Click OK.

7 Restart the computer.

Adding Class of Service Ranges and Protocols

You can add information for Class of Service applications that you want to prioritize but which are not listed on the 3Com Class of Service Setup window (Figure 4-12).

You must specify port or socket ranges as well as the network protocol being used. Obtain the information from the application manufacturer.

The Class of Service network driver uses these ranges to determine whether a packet should be treated as high-priority. If you are not able to obtain the range, you can set the entire range to 0000–9999.

To add the Class of Service ranges and protocols, follow these steps:

1 Click the Additional Ranges tab.

The Class of Service Additional Ranges window appears, as shown in Figure 4-13.

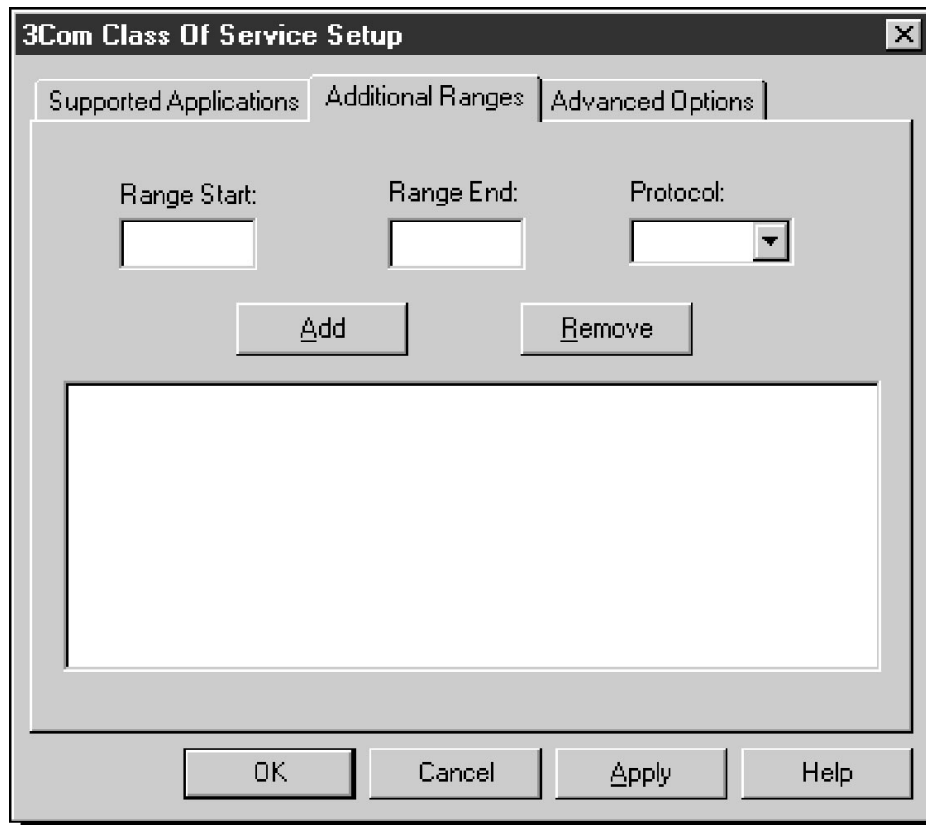


Figure 4-13 Class of Service Additional Ranges Window

2 Enter the beginning of the port or socket range for the application in the Range Start box.

The range start should be a hexadecimal value with a maximum of four digits.

3 Enter the inclusive range end value of the port or socket range for the application.

The range end should be a hexadecimal number with a maximum of four digits. If only one port or socket is needed, Range End should match Range Start.

4 Select the protocol that the application uses.

The protocol can be TCP, UDP, or IPX.



Some applications support multiple protocols and have port or socket ranges for each protocol. In this case, the range or protocol must match the protocol on the PC. For example, if only TCP/IP is installed, do not enter the socket range for IPX, because doing so will adversely affect driver performance.

5 Once the Range Start, Range End, and Protocol are entered press *Add*.

The range is added to the list, as shown in Figure 4-14.

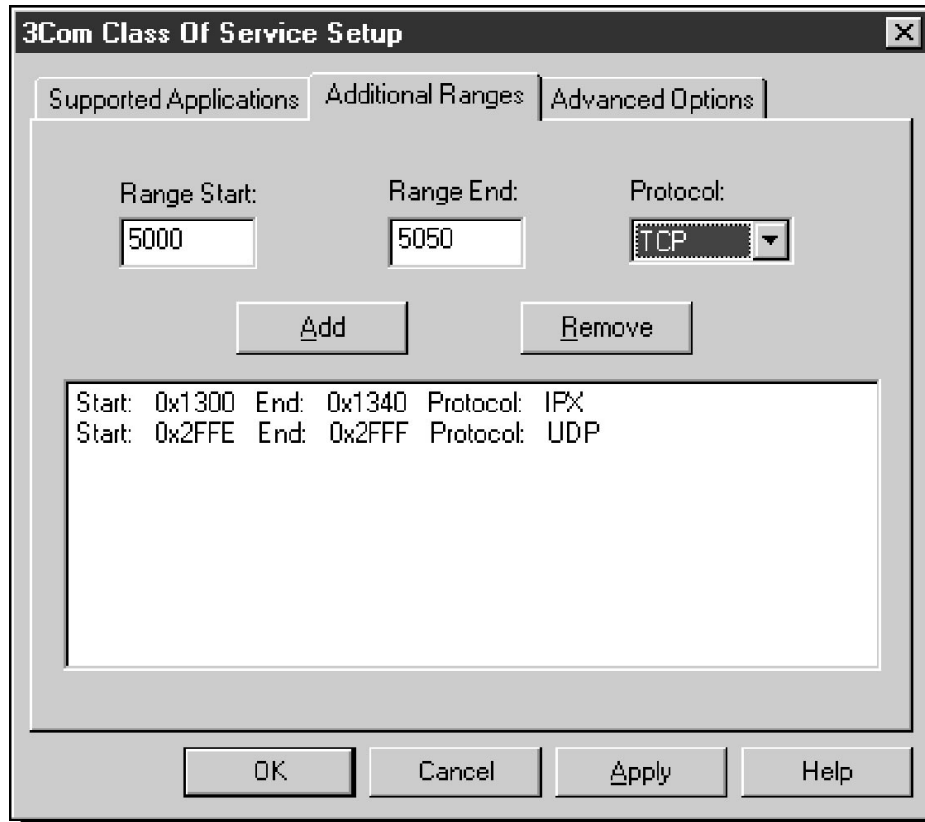


Figure 4-14 Additional Ranges Window Showing Data

6 Click *OK* when you are finished.

To remove a range, select the range in the list and click *Remove*.

7 Restart the computer.

Using Class of Service Advanced Options

You can use Class of Service Advanced Options to adjust the network driver's handling of certain types of Class of Service traffic. The advanced options are set to certain default values recommended by 3Com. In general, you do not need to change these values, but you can do so if you wish. Contact network administration before changing these options.

To access the advanced options, follow these steps:

1 Click the Advanced Options tab.

The Class of Service Advanced Options window appears, as shown in Figure 4-15.

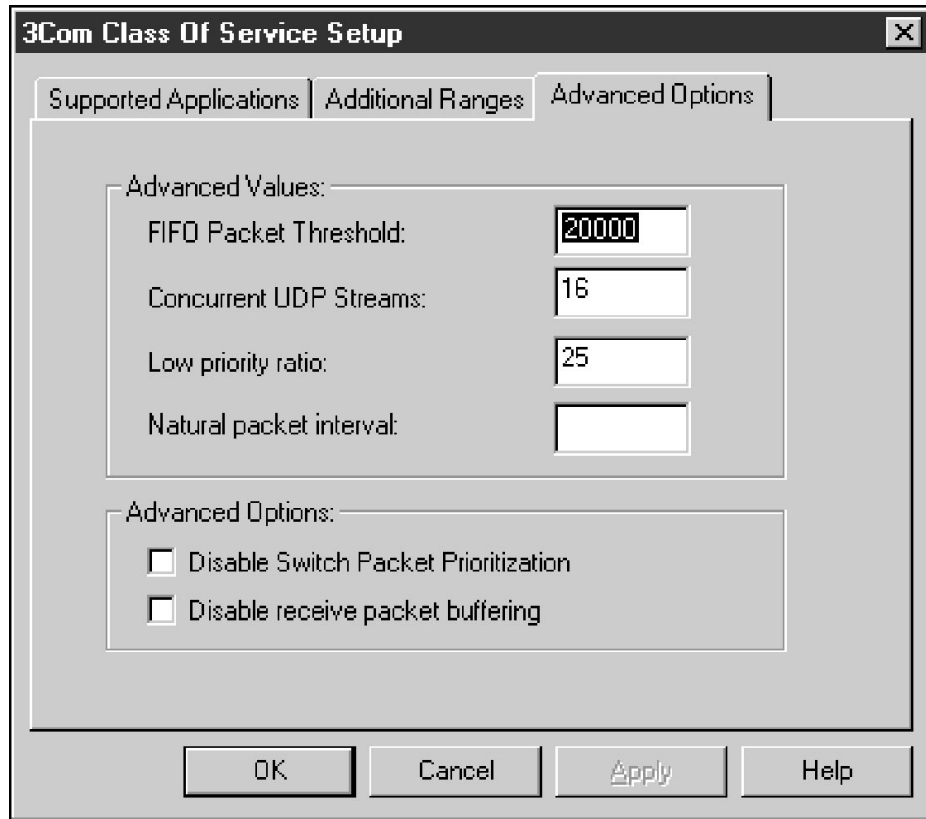


Figure 4-15 Class of Service Advanced Options Window

- 2 Enter new information as required.**
- 3 Click *OK* to set the new value.**
- 4 Restart the computer to activate changes.**

Class of Service Advanced Options Settings

This section provides a detailed description of each Advanced Values field shown on the Class of Service Advanced Options window.

FIFO Packet Threshold This setting controls the number of non-Class of Service bytes the network driver will allow in the FIFO ahead of any Class of Service packets. A smaller number decreases the time between Class of Service packets but can adversely affect performance. The default value of 20,000 is the recommended setting.

Concurrent UDP Streams This option controls the number of simultaneous multimedia UDP packet streams the network driver can handle at any time. For many applications, the number of UDP streams is the same as the number of connections.

For example, for videoconferencing with three people, applications use three UDP streams for the video data. The value must be a power of 2 (2, 4, 8) but the optimal value may vary depending on the PC and application.

A video server may support 32 connections, but a client may only want to conference with four other people at a time.

The default value of 16 is the recommended setting for most applications.

Low-Priority Ratio When Class of Service support is enabled, high-priority packets are always transmitted before low-priority packets. If a certain high-priority application sends out enough packets, no low-priority packets may be sent.

To prevent this problem, the driver uses a ratio value to periodically send out a low-priority packet (if one is waiting to be sent).

For example, if a value of 1000 is entered, one low-priority packet would be sent for every 1000 high-priority packets. The default value of 25 is the recommended setting for most applications.

Natural Packet Interval This field is not applicable. Any value entered in this field is ignored.

Disable Switch Packet Prioritization This option is not currently enabled. Any setting is ignored.

Disable Receive Packet Buffering This option is not currently enabled. Any setting is ignored.



5

IBM ENVIRONMENTS

This chapter describes how to install a 3C359 NIC network device driver for various IBM operating system environments.

This chapter also describes configuring 3C359 NIC connectivity to an IBM host computer (mainframe or AS/400) for various Windows environments.

Installing a Driver for Various IBM Environments

This section describes how to install a 3C359 NIC network device driver for various IBM operating system environments.

Installing the IBM LAN Support Program (DXMAID) and the DOS NDIS 2.01 Driver

Follow these steps to install the IBM LAN Support Program (DXMAID) and the DOS NDIS 2.01 driver for IBM host connectivity applications. The DOS NDIS 2.01 driver can also handle DOS LAN requests to IBM LAN Server.

- 1 At the DOS prompt on a DOS machine, run the DXMAID installer from the *IBM LAN Support Program* diskette.**
- 2 Press Enter at the first three Information windows.**
- 3 In the Setup window, press Enter to accept all the default values.**
- 4 If you are using the 3.5-inch *TokenDisk* diskettes, insert *TokenDisk* diskette #2 in the drive. If you are using the *TokenDisk* CD, insert it in the CD-ROM drive.**
- 5 In the Process Driver Diskette window, enter the path for the NDIS driver. For example, if you are using the 3.5-inch *TokenDisk* diskettes, enter:**

a:\ndis2\dos

If you are using the *TokenDisk* CD, substitute the appropriate drive in the path.

- 6 Insert the *IBM LAN Support Program* diskette in the drive when prompted.**

The Primary Adapter Driver shown is *3Com TokenLink Velocity XL PCI*.

- 7 Press F4 to install the driver.**
- 8 If you are using the 3.5-inch *TokenDisk* diskettes, insert *TokenDisk* diskette #1 in the drive when prompted.**

This completes the installation of DXMAID and the DOS NDIS 2.01 driver. Restart your computer and install your host connectivity application.

Installing a Driver for IBM DOS LAN Services

Follow these steps to install the NDIS 2.01 driver for IBM DOS LAN Services for IBM LAN Server 4.0 or IBM Warp Server:

- 1 Create a temporary directory on your DOS PC. For example, enter:**

```
mkdir c:\temp
```
- 2 If you are using the 3.5-inch diskettes, insert *TokenDisk* diskette #2 in the drive. If you are using the *TokenDisk* CD, insert it in the CD-ROM drive.**
- 3 Copy the following files from the *TokenDisk* diskette to the temporary directory. For example, enter:**

```
copy a:\ndis2\dos\oemsetup.inf c:\temp  
copy a:\ndis2\dos\tlnkpn2.dos c:\temp
```

If you are using the *TokenDisk* CD, substitute the appropriate drive in the path.
- 4 Insert *IBM DOS LAN Services* diskette #1 in the drive.**
- 5 From the DOS prompt, enter:**

```
a:\install
```
- 6 Press Enter when the welcome screen is displayed.**
- 7 Press Enter to accept the default directory C:\NET as the location to install IBM DOS LAN Services.**
- 8 From the list of network cards presented, select *Network Card Not Shown In List Below*.**

- 9 Enter the path of the temporary directory for the OEMSETUP.INF file:
`c:\temp`
- 10 The *3Com TokenLink Velocity XL PCI* NIC is selected. Press Enter.
- 11 Enter the machine ID, user name, and domain name.
- 12 Press Enter to accept the list of options chosen.
- 13 Finish installing files from the IBM DOS LAN Services diskettes.
- 14 If you are using the 3.5-inch *TokenDisk* diskettes, insert *TokenDisk* diskette #1 in the drive.
- 15 Copy the microcode file TLNKP.MAC from the *TokenDisk* to your hard drive. For example, if you are using the 3.5-inch *TokenDisk* diskettes, enter:
`copy a:\tlntp.mac c:\net`

If you are using the *TokenDisk* CD, substitute the appropriate drive in the microcode file's path.

This completes the driver installation for IBM DOS LAN Services. Restart your computer and install your host connectivity application.

Using IBM MPTS to Install a Driver for OS/2

If your OS/2 network operating system has not yet been installed on your computer, install it now and follow its instructions for installing device drivers. If an OS/2 network operating system has previously been installed, follow the instructions here for using IBM Multiprotocol Transport Services (MPTS) to install device drivers.

- 1 **Start IBM MPTS by performing either of the following actions:**
 - From the OS/2 desktop, double-click the *MPTS* icon.
 - From an OS/2 window, go into the *IBMCOM* subdirectory and at the OS/2 prompt, enter:
`mpts`
- 2 **Select OK on the MPTS logo panel.**

3 Select *Install*.

You are prompted for the source of the NIF file.

4 If you are using diskettes, insert *TokenDisk* diskette #2 in a drive (for example, drive A) and enter:

a:\ndis2\os2

If you are using the *TokenDisk* CD, insert it in the CD-ROM drive (for example, drive D) and enter:

d:\ndis2\os2

5 When the Installation Complete message appears, select *OK*.

You are returned to the main menu.

6 Select *Configure* in the MPTS dialog box.**7 In the Configure panel, verify that *LAN Adapters and protocols* is preselected, and then select *Configure* at the bottom of the panel.****8 In the Configure panel in the Network Adapters group box, select *3Com TokenLink Velocity XL PCI* and click *ADD*.**

You can edit parameter settings for the 3C359 NIC. Select the 3C359 NIC in the Current Configuration list box and click Edit. When you are finished with the parameter settings, click OK.

9 In the Protocols list box, select the protocols used by your network application. Select each protocol and click *ADD*.

If you are not sure which protocols to use, select IBM IEEE 802.2 and IBM OS/2 NetBIOS protocol drivers or ask your network administrator.

The protocol drivers you have selected will appear under the NIC driver name in the Current Configuration list box.



You can edit parameter settings for the protocols. Select a protocol and then click Edit.

10 When you have finished selecting and editing protocols in the Configuration panel, click *OK*.**11 Click *Close* in the Configuration panel.**

- 12 Click *Exit* in the MPTS dialog box.
- 13 Click *Exit* in the Update CONFIG.SYS panel to update the CONFIG.SYS file.
- 14 When you get the message that the CONFIG.SYS file has been successfully updated, click *OK*.
- 15 Click *Exit* in the Exiting MPTS panel.
- 16 If you are using the 3.5-inch *TokenDisk* diskettes, insert *TokenDisk* diskette #1 in the drive.
- 17 Copy the microcode file TLNKP.MAC from the *TokenDisk* to your hard drive. For example, enter:
`copy a:\tlntp.mac c:\ibm\macs`
If you are using the *TokenDisk* CD, substitute the appropriate drive in the microcode file's path.
- 18 Shut down OS/2 and restart your computer to let the changes take effect.
- 19 At system startup, check for the following conditions to determine whether the NIC is working correctly and whether installation has been completed successfully:
 - The device driver files loaded successfully. There are no error messages.
 - You are able to log on and communicate with the network.

If you experience problems, see Chapter 6, "Troubleshooting."

Installation of the driver for OS/2 is now complete.

Configuring IBM Host Connectivity

This section describes the initial phase of configuring 3C359 NIC connectivity to an IBM host computer (mainframe or AS/400) for various Windows environments. This phase involves adding the appropriate network protocol to enable host connectivity.

After adding the network protocol, install the host connectivity applications (such as client access and emulator applications) that are appropriate for your environment.

Adding the MS-DLC Network Protocol for Windows for Workgroups

Follow the steps in this section to add the Microsoft MS-DLC network protocol to the Windows for Workgroups Add Network Protocol list for the 3C359 NIC. The MS-DLC protocol is required for connectivity between your PC and an IBM host computer.

Before proceeding, make sure that you have the Microsoft MS-DLC network protocol available. If the MS-DLC protocol is not currently available, download it from the Microsoft Web site to a temporary storage location on your PC's hard disk or on a diskette.

- 1 In the Windows for Workgroups Program Manager window, double-click the *Network* icon.**
- 2 In the Network window, double-click the *Network Setup* icon.**
- 3 In the Network Setup window, click *Network Drivers*.**
- 4 In the Network Drivers window, make sure that *3Com TokenLink Velocity XL PCI Adapter* is displayed. Click *Add Protocol*.**
- 5 In the Add Network Protocol window, select *Unlisted or Updated Protocol*. Click *OK*.**
- 6 In the Install Driver window, enter the path for the MS-DLC protocol. If the protocol is stored on diskette, insert the diskette in the drive. Click *OK*.**
- 7 In the Unlisted or Updated Protocol window, select *MS-DLC*. Click *OK*.**

The Network Driver window is displayed.

- 8 Verify that the MS-DLC protocol is displayed under *3Com TokenLink Velocity XL PCI Adapter*. Click *Close*.**

The Network Setup window is displayed.

- 9 Click *OK*.**

The MS-DLC files are copied, and the Network Setup window displays a message indicating that the AUTOEXEC.BAT, SYSTEM.INI, and PROTOCOL.INI files have been modified.

10 In the Network Setup message window, click *OK*.

The Windows Setup window displays the following message:

You need to quit Windows and restart your computer so that changes you made will take effect. Do not press CTRL+ALT+DEL to restart your computer--this may cause you to lose work. Restart the computer now?

11 In the Windows Setup message window, click *Restart Computer*.

This completes the procedure for adding the Microsoft MS-DLC network protocol to the Windows for Workgroups Add Network Protocol list for the 3C359 NIC.

After adding the network protocol, install the host connectivity applications (such as client access and emulator applications) that are appropriate for your environment.

Adding the 32-Bit DLC Network Protocol for Windows 95

Follow the steps in this section to add the Microsoft 32-bit DLC network protocol to the Windows 95 Network Protocols list for the 3C359 NIC. The 32-bit DLC protocol is required for connectivity between your PC and an IBM host computer.

Before proceeding, make sure that you have the Microsoft 32-bit DLC network protocol available. If you are using Windows 95 version 950 or 950a (the "retail" version), you must download the 32-bit DLC protocol from the Microsoft Web site to a temporary storage location on your PC's hard disk or on a diskette. Windows 95 version 950b, OSR2, includes the 32-bit DLC protocol.

- 1 On the Windows 95 desktop, double-click the *My Computer* icon.**
- 2 Double-click the *Control Panel* icon.**
- 3 Double-click the *Network* icon.**
- 4 In the Network window, select *3Com TokenLink Velocity XL PCI Adapter* in the Configuration tab. Click *Add*.**

5 In the Select Network Component Type window, select *Protocol*. Click *Add*.

Windows builds the driver information database and displays the Select Protocol window.

6 Select *Microsoft* in the Manufacturers list.

7 Do one of the following:

- If you are using Windows 95 version 950b, OSR2, select *Microsoft 32-bit DLC* in the Network Protocols list.

The Configuration tab of the Network window appears. Proceed to step 9.

- If you are using Windows 95 version 950 or 950a ("retail" version), click *Have Disk*.

The Install From Disk window is displayed. Continue at step 8.

8 If you are using Windows 95 version 950 or 950a ("retail" version), do one of the following:

- If you have copied the Microsoft 32-bit DLC protocol to diskette, insert the diskette in the drive.
- If you have copied the DLC protocol to the hard drive, enter the appropriate path for the downloaded Microsoft 32-bit DLC protocol in the Install From Disk window. Click *OK*.

9 Verify that *Microsoft 32-bit DLC* is displayed for the *3Com TokenLink Velocity XL PCI Adapter* in the Configuration tab of the Network window. Click *OK*.

Windows copies the protocol files. The System Settings Change window displays the following message:

You must restart your computer before the new settings will take effect. Do you want to restart your computer now?

10 Click *Yes*.

This completes the procedure for adding the Microsoft 32-bit DLC network protocol to the Windows 95 Network Protocols list for the 3C359 NIC.

After adding the network protocol, install the host connectivity applications (such as client access and emulator applications) that are appropriate for your environment.

Adding the 32-Bit DLC Network Protocol for Windows NT

Follow the steps in this section to add the Microsoft 32-bit DLC network protocol to the Windows NT Network Protocols list for the 3C359 NIC. The 32-bit DLC protocol is required for connectivity between your PC and an IBM host computer.

- 1 On the Windows NT desktop, double-click the *My Computer* icon.**
- 2 Double-click the *Control Panel* icon.**
- 3 Double-click the *Network* icon.**
- 4 In the Network window, select the Protocols tab. Click *Add*.**
- 5 In the Select Network Protocol window, select *DLC Protocol*. Click *OK*.**
- 6 Insert the Windows NT CD in the CD-ROM drive. In the Windows NT Setup window, enter the path for the Windows NT CD. For example:
d:**

The Protocols tab of the Network window is displayed.

- 7 Verify that *DLC Protocol* is displayed. Click *Close*.**

Bindings messages are displayed. The Network Settings window displays the following message:

You must shut down and restart your computer before the new settings will take effect. Do you want to restart your computer now?

- 8 Click *Yes*.**

This completes the procedure for adding the Microsoft 32-bit DLC network protocol to the Windows NT Network Protocols list for the 3C359 NIC.

After adding the network protocol, install the host connectivity applications (such as client access and emulator applications) that are appropriate for your environment.



6

TROUBLESHOOTING

This chapter describes how to isolate and solve 3C359 NIC hardware and network cabling problems.

3C359 NIC LEDs

Light-emitting diodes (LEDs) on the backplate of the 3C359 NIC, shown in Figure 6-1, indicate the configured ring speed and whether or not the 3C359 NIC is inserted into the ring. The LEDs also light when drivers are loading and when the diagnostics program is running.

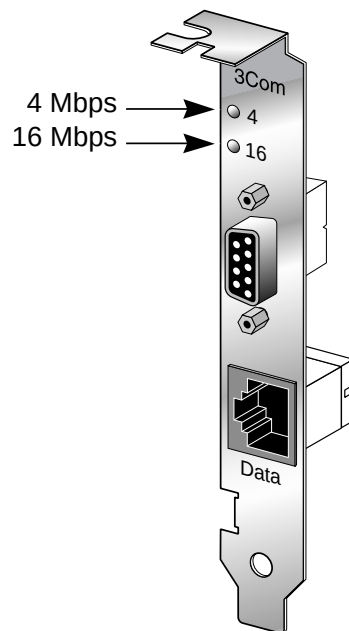


Figure 6-1 NIC LEDs

When the green LED (labeled "4") is lit, it indicates that the 3C359 NIC is set to 4 Mbps speed and is correctly inserted into the token ring network.

When the yellow LED (labeled "16") is lit, it indicates that the 3C359 NIC is set to 16 Mbps and is correctly inserted into the token ring network.

Using the Diagnostic Program

You can troubleshoot the 3C359 NIC configuration and test for physical board problems by running the DOS Configuration and Diagnostic Program.



Configuration instructions are described in Appendix B.

The diagnostic part of the program tests the 3C359 NIC, not the network. However, a lobe cable must be connected from the 3C359 NIC to a retiming concentrator or MAU for all tests. A lobe cable is the section of cable that attaches a ring station or network device to a MAU or wiring hub.



The diagnostic program does not function properly if the 3C359 NIC drivers are already installed and running in memory. You must bypass the drivers by performing a clean DOS boot before you run the diagnostic program. Use a DOS diskette if you are running a version of DOS earlier than DOS 6.x.

DOS Diagnostic Tests

The diagnostics test physical components, connectors, and circuitry of the 3C359 NIC, as follows.

Register Write/Read Test

This test verifies accurate writing and reading of the 3C359 NIC's control registers.

Local RAM Write/Read Test

This test verifies that the PC can correctly access the total 64 KB of available local RAM.

Timer Test

This test verifies the 3C359 NIC's timer operations by comparing the 3C359 NIC's timers to the PC's timer.

Open NIC for Ring Operation Test

This test prepares the 3C359 NIC for a NIC ring operation test and verifies the 3C359 NIC's ability to transmit and receive data over the network. This test requires you to connect to an STP or a UTP cable with a DAU, MAU, CAU, or token ring switch at the other end.

Ring Operations Test

This test assesses communication on the ring. The 3C359 NIC must be attached to the ring to run this test successfully. The 3C359 NIC also must be set to the correct ring speed.

Close NIC Test

This test verifies the 3C359 NIC's ability to close the 3C359 NIC and terminate the Ring Operations Test. The 3C359 NIC must have been previously opened.

Running the DOS Diagnostic Tests

If you are using Windows 95 or Windows for Workgroups, exit Windows and restart the PC in MS-DOS mode, or boot from a DOS diskette. If you are running Windows NT, boot from the DOS partition or boot from a DOS diskette to run the diagnostic program.

- 1 If you are using the 3.5-inch diskettes, insert *TokenDisk* diskette #1 in the drive (for example, the A drive) and enter:**

a:\3pcid

If you are using the *TokenDisk* CD, insert it in the CD-ROM drive (for example, the D drive) and enter:

d:\3pcid

The DOS Configuration and Diagnostic Program window is displayed with the *Test* menu selected, as shown in Figure 6-2.

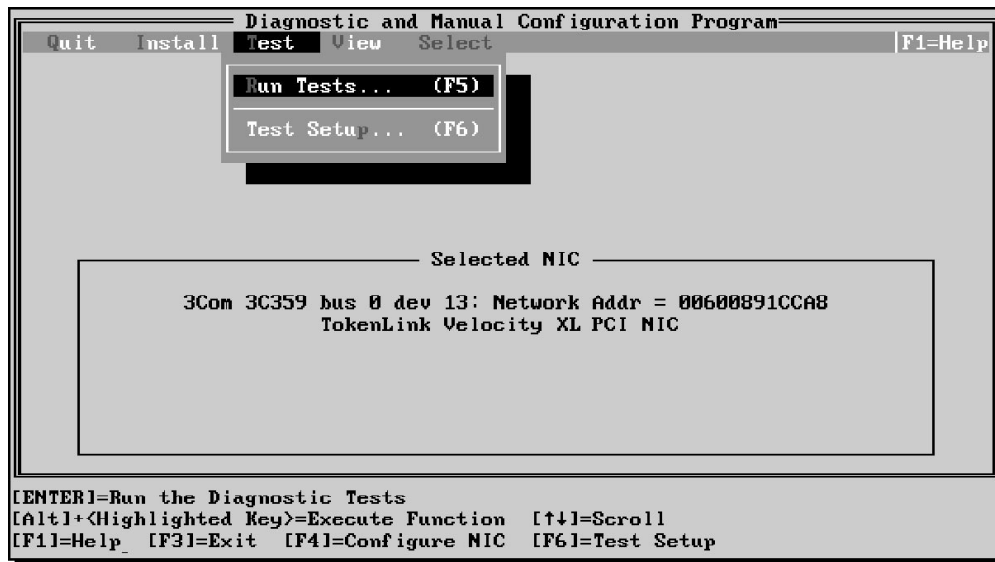


Figure 6-2 Test Menu

2 From the **Test** pull-down menu shown in Figure 6-2, select **Run Tests**.

The Run Tests dialog box appears, similar to the one shown in Figure 6-3.

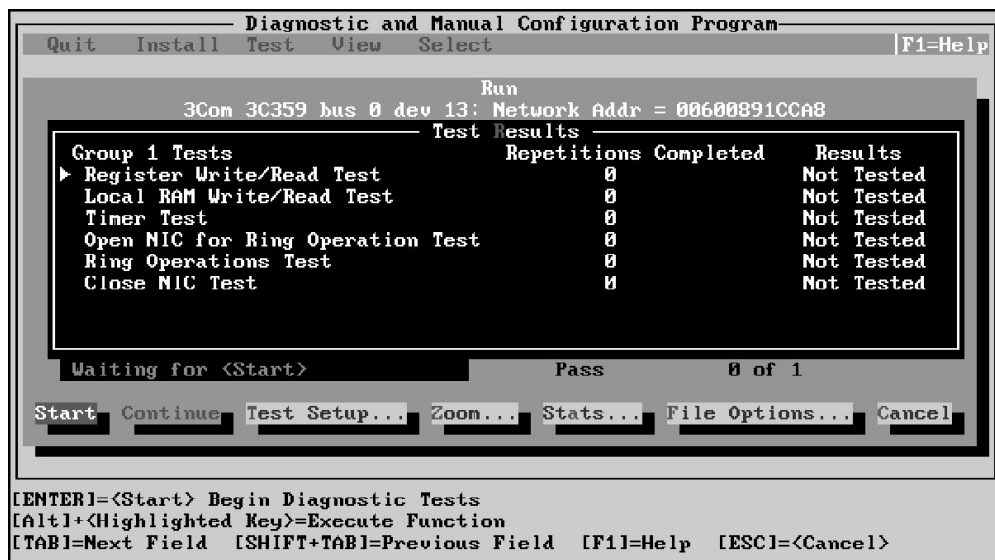


Figure 6-3 DOS Diagnostic Program Run Tests Dialog Box

3 Press Enter to start the tests.

Each test runs once unless you specify otherwise. The test results are displayed with "Passed" or "Failed" in the Results column.

To run the tests continuously, select the *Continuous* option in the Test Setup dialog box, as described in the next section, "Changing the DOS Test Setup."

Changing the DOS Test Setup

To change the test parameters, follow these steps:

- 1 **Select *Test Setup* in the Run Tests dialog box and press Enter.**

The Test Setup dialog box appears, as shown in Figure 6-4.

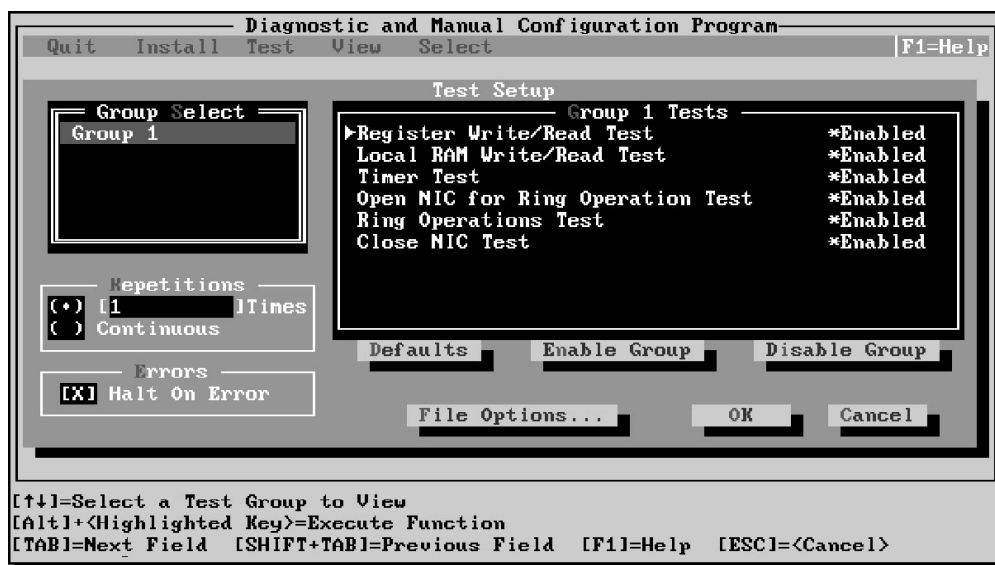


Figure 6-4 DOS Diagnostic Program Test Setup Dialog Box

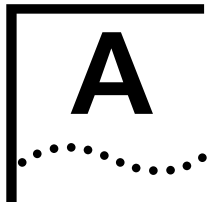
- 2 **Press Tab to move from field to field and select any field within the Test Setup dialog box.**

Within the Group Select area, use the arrow keys to select Group 1. (Future software enhancements will provide additional test groups.) Use the *Enable Group* or *Disable Group* options to enable or disable a group of tests.

For test descriptions, see "DOS Diagnostic Tests" earlier in this chapter.

- 3 **Select *OK* and press Enter.**
- 4 **To run the tests, select *Run Tests* from the *Test* menu and select *Start*.**





SPECIFICATIONS

This appendix lists 3C359 NIC specifications, connector pin assignments, and cable requirements.

3C359 NIC Specifications

The 3C359 NIC provides a high-performance 32-bit PCI local bus interface with bus mastering that runs at a clock speed of 33 MHz.

Network Interface

IEEE 802.5 token ring network with 16 Mbps or 4 Mbps transmission rate.

Physical Dimensions

Length: 14.605 cm (5.75 in)

Height: 10.668 cm (4.20 in)

Environmental Operating Range

Operating temperature: 0° to 55 °C (32° to 131 °F)

Storage -40° to 80 °C (-40° to 176 °F)

Relative humidity (noncondensing)

Operating: 10% to 90%

Storage: 5% to 95%

Power Requirements at 16 Mbps

0 mA @ +3.3 V, maximum

400 mA @ +5 V, maximum

0 mA @ +12 V, maximum

Compatibility

PCI Local Bus Specification, Revision 2.1

*PCI Bus Power Management Interface Specification,
Revision 1.0 (Draft)*

*Advanced Configuration and Power Interface Specification,
Revision 1.0*

Bus Data Interface

32-bit bus mastering

Interrupts (IRQs)

Automatically allocated by system

Node ID

Globally administered node ID allocated by IEEE

Locally administered node ID optional

Cables and Connectors

Category 3, 4, 5 for UTP (RJ-45)

Type 1, 1A, 2, 6 for STP (DB-9)

Emissions Classifications

FCC Class B, digital device

EN55022 Class B

Canadian Class B digital apparatus

VCCI Class 2 category

European Community Classification

EE-Compliant

Safety Classifications

UL 1950 (ITE)

TUV EN60950:1992

Electromagnetic Susceptibility

EN50082-1

Connector Pin Assignments

You can connect the 3C359 NIC to a network through the NIC's DB-9 connector or RJ-45 connector. Pin assignments for both connector types are shown in the following sections.

DB-9 Connector Pin Assignments

You can use the 3C359 NIC's DB-9 connector to connect to shielded twisted-pair (STP) cabling (Type 1 or 6). The DB-9 connector pin assignments are shown in Figure A-1.

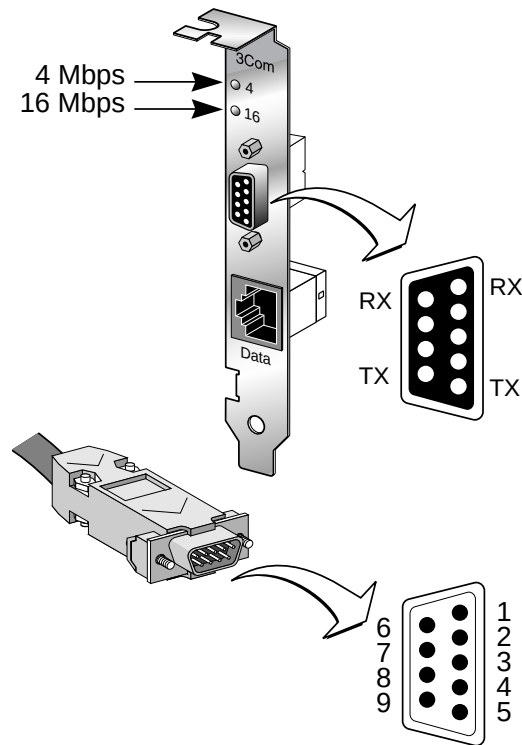


Figure A-1 DB-9 Connector Pin Assignments

RJ-45 Connector Pin Assignments

You can use the 3C359 NIC's RJ-45 connector to connect to unshielded twisted-pair (UTP) cabling (Category 3, 4, or 5). The RJ-45 connector pin assignments are shown in Figure A-2.

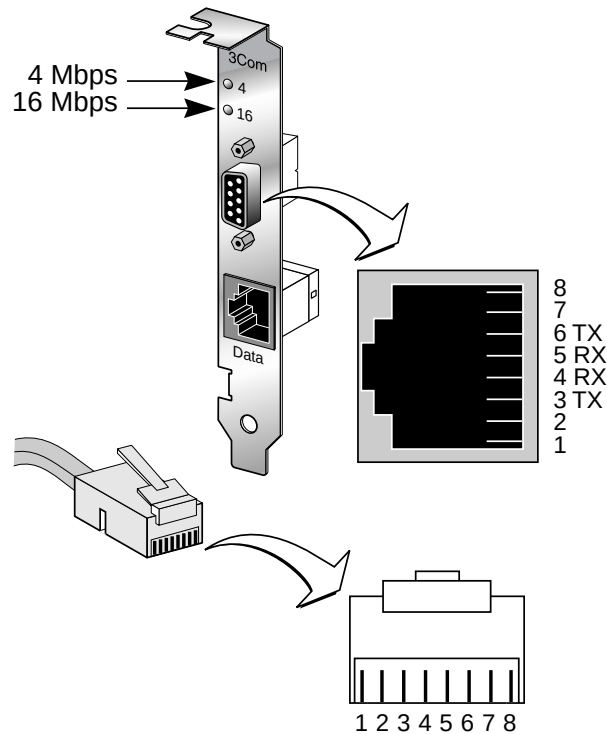


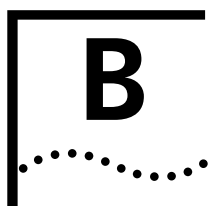
Figure A-2 RJ-45 Connector Pin Assignments

Cable Requirements

The 3C359 NIC supports industry-standard token ring cabling that meets IEEE 802.5 specifications.

Connect shielded twisted-pair (STP) cables (type 1 or 6) to the 3C359 NIC's DB-9 connector (Figure A-1).

Connect unshielded twisted-pair (UTP) cables (category 3, 4, or 5) to the 3C359 NIC's RJ-45 connector (Figure A-2).



CHANGING CONFIGURATION SETTINGS

You can change the 3C359 NIC's configuration settings through a DOS Configuration and Diagnostic Program provided on *TokenDisk* diskette #1 and on the *TokenDisk* CD.

This appendix provides configuration instructions. Instructions for testing the NIC with the diagnostic part of the DOS Configuration and Diagnostic Program are located in Chapter 6, "Troubleshooting."

Using the Configuration Program

Before running the DOS Configuration and Diagnostic Program, perform a clean DOS boot from a DOS diskette (or the hard drive's DOS option, if provided) to ensure that no memory managers or drivers are loaded. The Configuration and Diagnostic Program does not run in a DOS window called from another operating system.

To change the configuration option settings for the 3C359 NIC, follow these steps.

- 1 If you are using the 3.5-inch diskettes, insert *TokenDisk* diskette #1 in the drive and make it the active drive. For example, enter:**
a:
If you are using the *TokenDisk* CD, insert it in the CD-ROM drive and make that drive the active drive. For example, enter:
d:
- 2 Enter:**
3pcid

The DOS Diagnostic and Configuration Program screen is displayed with the *Test* menu selected, as shown in Figure B-1.

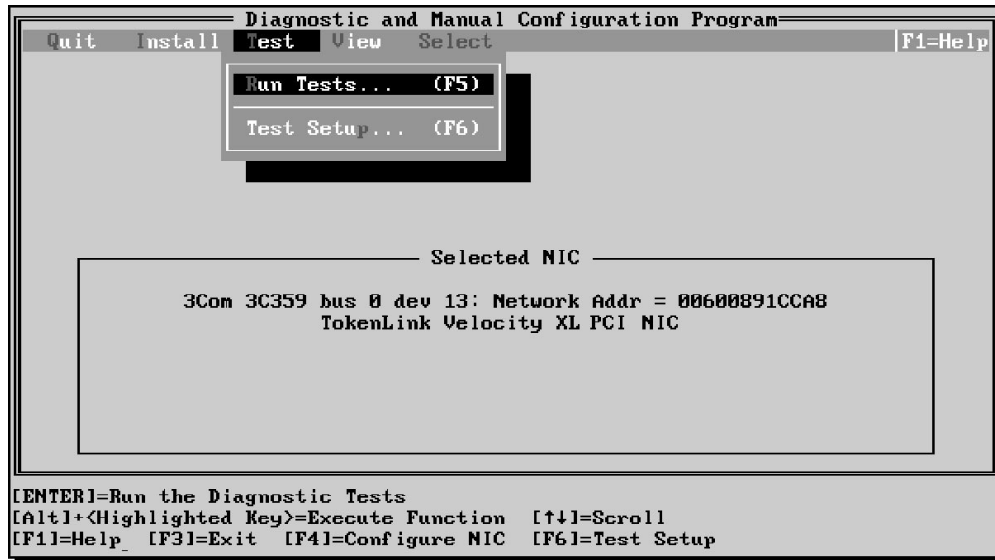


Figure B-1 Configuration and Diagnostic Program Screen

3 Press Tab to select the *Install* pull-down menu shown in Figure B-2.



You can use a mouse instead of keys to select options, provided a mouse driver is installed on your PC. When using a mouse, click the desired option.

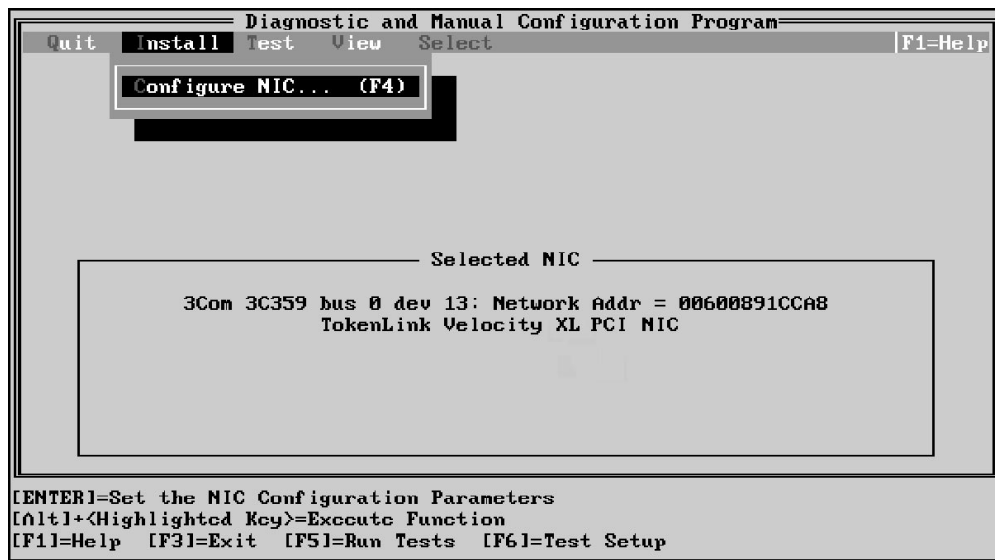


Figure B-2 Install Menu

4 From the *Install* pull-down menu, press Enter to select *Configure NIC*.

The NIC Configuration screen appears, as shown in Figure B-3.

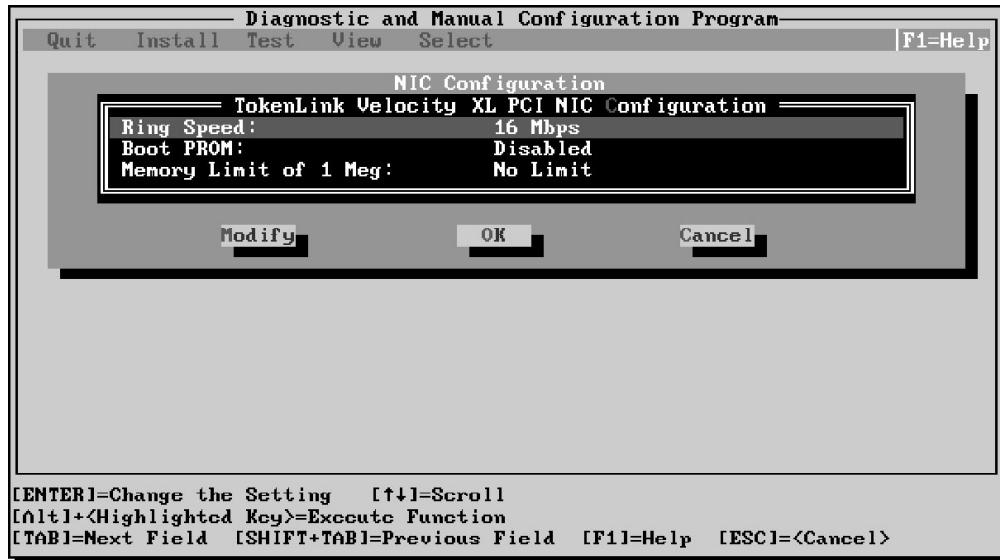


Figure B-3 NIC Configuration Screen

5 Use the arrow (scroll) keys to select a configuration option that you want to change. Press Enter.

A dialog box similar to the one shown in Figure B-4 appears to allow you to choose from available configuration settings.



Figure B-4 Configuration Option Setting Dialog Box

Use the arrow keys to select the option you want, pressing Enter to display the dialog box for each option.

- 6 When you have completed your configuration changes, press Tab until OK is selected.**
- 7 Press Enter to save the new configuration settings for the NIC.**

Adjusting Configuration Settings

Configuration for the 3C359 NIC is automatic for all operating systems. When you turn on the computer after installing the NIC, Plug and Play (PnP) automatically assigns all resources.

Table B-1 lists the default configuration settings of the 3C359 NIC at shipment.

Table B-1 Initial Settings of 3C359 NIC Configuration Options

Configuration Option	Default Setting
Ring Speed	16 Mbps
Boot ROM	Disabled
Memory Limit of 1 MB	No Limit

Ring Speed

The 3C359 NIC operates at a ring speed of either 4 or 16 Mbps. The 3C359 NIC ring speed must match the speed of the token ring network. The default value is 16 Mbps.

The auto ring speed detection feature is enabled by default for all 3C359 NIC drivers. Auto ring speed detection overrides any manual setting of the ring speed through the 3C359 NIC configuration program. To disable auto ring speed detection and manually set the ring speed to either 16 Mbps or 4 Mbps, see "Selecting Ring Speed," in Chapter 4.



It is recommended that you disable auto ring speed detection if you are installing the 3C359 NIC in a server. Otherwise, the server can fail to insert into the ring if it is the first station to come online and cannot detect a ring speed.

Boot ROM

To use this option, you must have installed the 3C359-TRIROM in the boot ROM socket on the NIC. (The 3C359-TRIROM must be ordered separately. See installation instructions in the TriROM user guide.) When enabled, the NIC allows the system to access BootWare residing in the TriROM, enabling the PC to boot (with or without a hard drive) remotely from a LAN server in TCP/IP, NetWare, and RPL environments. The default setting is *Disabled*.

Memory Limit of 1 Megabyte

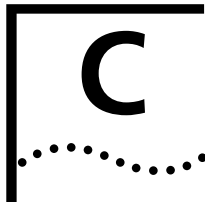
When disabled (set to *No Limit*), the MMIO address space can be mapped above the standard conventional memory address limit of 1 megabyte.

Changing Configuration for Multiple NICs

If you have more than one 3C359 NIC in your PC, you must select the NIC you want to configure.

From the DOS *Configuration and Diagnostic Program* menu (Figure B-1), press Tab to select the *Select* pull-down menu. Select the 3C359 NIC you want to configure. Continue with configuration instructions as described earlier in this appendix.





TECHNICAL SUPPORT

3Com provides easy access to technical support information through a variety of services. This appendix describes these services.

Information contained in this appendix is correct at time of publication. For the very latest, we recommend that you access 3Com Corporation's World Wide Web site.

Online Technical Services

3Com offers worldwide product support 24 hours a day, 7 days a week, through the following online systems:

- World Wide Web site
- 3Com Bulletin Board Service (3ComBBS)
- 3ComFactsSM automated fax service
- 3ComForum on CompuServe online service

World Wide Web Site

Access the latest networking information on 3Com Corporation's World Wide Web site by entering our URL into your Internet browser:

<http://www.3com.com/>

This service features the latest information about 3Com solutions and technologies, customer service and support, news about the company, *Net Age*® Magazine, technical documentation, and more.

3Com Bulletin Board Service

3ComBBS contains patches, software, and drivers for all 3Com products, as well as technical articles. This service is available through analog modem or digital modem (ISDN) 24 hours a day, 7 days a week.

Access by Analog Modem

To reach the service by modem, set your modem to 8 data bits, no parity, and 1 stop bit. Call the telephone number nearest you:

Country	Data Rate	Telephone Number
Australia	up to 14400 bps	61 2 9955 2073
Brazil	up to 14400 bps	55 11 5181 9666
France	up to 14400 bps	33 1 6986 6954
Germany	up to 28800 bps	4989 62732 188
Hong Kong	up to 14400 bps	852 2537 5601
Italy	up to 14400 bps	39 2 27300680
Japan	up to 14400 bps	81 3 3345 7266
Mexico	up to 28800 bps	52 5 520 7835
P.R. of China	up to 14400 bps	86 10 684 92351
Taiwan, R.O.C.	up to 14400 bps	886 2 377 5840
U.K.	up to 28800 bps	44 1442 438278
U.S.A.	up to 28800 bps	1 408 980 8204

Access by Digital Modem

ISDN users can dial in to 3ComBBS using a digital modem for fast access up to 56 Kbps. To access 3ComBBS using ISDN, use the following number:

1 408 654 2703

3ComFacts Automated Fax Service

3Com Corporation's interactive fax service, 3ComFacts, provides data sheets, technical articles, diagrams, and troubleshooting instructions on 3Com products 24 hours a day, 7 days a week.

Call 3ComFacts using your Touch-Tone telephone using one of these international access numbers:

Country	Telephone Number
U.K.	44 1442 438279
U.S.A.	1 408 727 7021

Local access numbers are available within the following countries:

Country	Telephone Number	Country	Telephone Number
Australia	1800 123 853	Netherlands	0800 0228049
Belgium	0800 71279	Norway	800 11062
Denmark	800 17319	Portugal	0505 442 607
Finland	98 001 4444	Russia (Moscow only)	956 0815
France	0800 908158	Spain	900 964 445
Germany	0130 81 80 63	Sweden	020 792954
Italy	1678 99085	U.K.	0800 626403

3ComForum on CompuServe Online Service

3ComForum contains patches, software, drivers, and technical articles about all 3Com products, as well as a messaging section for peer support. To use 3ComForum, you need a CompuServe account.

To use 3ComForum:

- 1 Log on to your CompuServe account.**
- 2 Type go threecom**
- 3 Press Return to see the 3ComForum main menu.**

Support from Your Network Supplier

If additional assistance is required, contact your network supplier. Many suppliers are authorized 3Com service partners who are qualified to provide a variety of services, including network planning, installation, hardware maintenance, application training, and support services.

When you contact your network supplier for assistance, have the following information ready:

- A list of system hardware and software, including revision levels
- Diagnostic error messages
- Details about recent configuration changes, if applicable

If you are unable to contact your network supplier, see the following section on how to contact 3Com.

Support from 3Com

If you are unable to receive support from your network supplier, technical support contracts are available from 3Com.

Contact your local 3Com sales office to find your authorized service provider using one of these numbers:

Regional Sales Office	Telephone Number
3Com Corporation P.O. Box 58145 5400 Bayfront Plaza Santa Clara, California 95052-8145 U.S.A.	800 NET 3Com
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GLOSSARY

ACPI

Advanced Configuration and Power Interface. A power management specification developed by Microsoft, Toshiba, and Intel. ACPI, which will be part of Windows 98, enables the operating system to control the amount of power sent to each device attached to the computer. ACPI will enable manufacturers to produce computers that automatically power up as soon as you touch the keyboard. With ACPI, the operating system can turn off peripheral devices, such as CD-ROM players, when they are not in use. See *also* OnNow/(ACPI).

bus

A common pathway across which data can travel within a computer. This pathway is used for communication and can be established between two or more computer elements. In any computer, data travels over one or more buses between memory, the CPU, and peripheral components like NICs, video display adapters, SCSI controllers, and disk drives.

bus mastering

A bus design that allows NICs to move data and access the computer's memory and peripherals without support from the CPU.

CAU

Controlled access unit. An intelligent hub.

Class of Service (or Traffic Prioritization)

A 3Com DynamicAccess feature that helps to optimize network performance by letting you prioritize your applications for efficient network access. High-priority tokens are requested when the network transmits data for selected applications.

clean boot

A DOS boot with no memory managers or other programs (such as drivers) loaded in memory.

DAU

Dual access unit.

driver

A program, usually resident in the server or workstation memory, that controls the network hardware (such as NICs or controllers) or implements the protocol stacks through which higher-level applications communicate with the network hardware.

DTR

Dedicated Token Ring (DTR). An extension to the IEEE 802.5 standard that increases network performance in switched token ring environments. It allows data transmission using dedicated resources between the station and the concentrator. Transmissions can be either half-duplex or full-duplex.

DynamicAccess software

A 3Com set of features that adds intelligence to NICs to optimize network performance and provide enhanced network management and control.

full-duplex

A mode of operation in which a token ring station can simultaneously transmit and receive independent data streams. Dedicated transmissions occur between the station and switch; token passing no longer occurs.

hexadecimal

A number system with a base of 16. In hexadecimal, the first 10 digits are 0–9 and the last six digits are A–F. This number system is identified in this guide by a number or character followed by "h."

IEEE 802.5

The standard for the token ring access method and physical layer specifications developed by a subcommittee of the Institute for Electrical and Electronics Engineers (IEEE) 802 committee.

lobe

All network components in a specific area that physically connect to a specific MAU or wiring hub.

lobe cable

The section of cable that attaches a ring station or network device to a MAU or wiring hub.

MAU

Multistation access unit. A passive hub.

NDIS

Network Driver Interface Specification. A software specification used in many operating systems to create drivers for network NICs. NDIS drivers support multiple protocols and multiple NICs and can be unloaded from memory to conserve conventional DOS RAM space. NDIS permits the high-level protocol components to be independent of the NIC by providing a standard interface. Windows NT and Windows 95 support NDIS 3.0 and NDIS 4.0.

ODI

Open Data-link Interface. A MAC-level specification developed by Novell and Apple Computer. Like NDIS, the ODI driver supports multiple protocols and NICs and can be unloaded from memory to conserve conventional DOS RAM space.

OnNow/(ACPI)

A comprehensive system-wide approach to system and device power control. OnNow is a term for a PC that is always on but appears to be off and responds immediately to user or other requests. *See also* ACPI.

Parallel Tasking architecture

A proprietary technique developed and patented by 3Com that provides significant performance improvement by allowing network interchanges of data to occur in parallel.

Parallel Tasking II technology

A proprietary PCI bus master interface developed by 3Com that builds on the earlier Parallel Tasking architecture to achieve faster data transfer rates and lower CPU utilization.

Parallel Tasking II technology removes any limits on the size of the data bursts across the PCI bus.

PCI

Peripheral Component Interconnect. The PCI 32-bit bus provides a processor-independent data path between a PC's central processing unit (CPU) and high-speed peripheral devices. The PCI bus supports multiple peripheral components and add-in cards at a peak bandwidth of 132 MBps, which is up to 10 times faster than that of ISA, EISA, and MCA PC buses. PCI provides full Plug and Play support for automatic NIC configuration in the PC.

promiscuous mode

A method by which a NIC receives and forwards all network packets that arrive, regardless of the node to which they are addressed. This feature allows easy identification and resolution of network problems.

token ring

A network that employs a ring topology and passes tokens for ring access.

Traffic Prioritization

See Class of Service.

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